RRC-1258 MkII(s)
and
RRC-1258MkIIs Yaesu Twin

User Manual

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Table of contents

Statement of Conditions 6

General Description 7
Detachable control panel 7
PC-based control 8

Step by step system setup 9

Hardware 11
Front 11
Back 15
Strapping and jumpers 19

Configuration with Microbit Setup Manager 23
FW/HW 24
FW update 24
Setup 25
Net info 25

Initial IP setup 26

Configuration with WEB-interface 29

Configuration with WEB-interface 29
Info 30
Status 31
Profiles 32
IP Settings 34
Radio Settings 37
Serial Settings 42
Advanced settings 46
Dynamic DNS setting (only Radio-RRC) 48
Keyer Settings (only Control-RRC) 50
IO Settings 52
Ping settings (only Radio-RRC) 56
Export settings (HTML) 57
Export settings (bin) 57
Import settings (bin) 58
Application firmware upgrade 59
Bootloader firmware upgrade 60
Restart device 60

Configuration with terminal-interface 61

CW-Keyer 62
General 62
Settings 62
Connections 63

ICOM CI-V 65

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General 65
Hardware configuration 65
Radio settings (example) 66
Connections 67

ICOM IC-703, IC-706 70
General 70
Hardware configuration 70
Radio settings (example) 71
Connections 71
Power supply 72
Prepare the separation cable to IC-703 and IC-706 74

ICOM IC-R2500 78
General 78
Hardware configuration 78
Radio settings (example) 78
Connections 79

ICOM IC-E2820 82
General 82
Hardware configuration 82
Radio settings (example) 82

YAESU FT-8x7, FT-1000 86
General 86
Hardware configuration 86
Radio settings (example) 87
Connections 87

YAESU General (FT-2000) 92
General 92
Hardware configuration 92
Radio settings (example) 93
Connections 93

YAESU TWIN 97
General 97
Hardware configuration 98
Radio settings (example) 99
Connections 99

KENWOOD General 104
General 104
Hardware configuration 104
Radio settings (example) 105
Connections 106

KENWOOD TS-480 109
General 109
Hardware configuration 109
Radio settings (example) 110

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Connections 110
Power supply 111

KENWOOD TM-D710 114
General 114
Hardware configuration 114
Radio settings (example) 115
Power supply 115

KENWOOD TS-2000 118
General 118
Hardware configuration 118
Radio settings (example) 120
Connections 120

ELECRAFT 124
General 124
Hardware configuration 124
Radio settings (example) 125
Connections 125

ALINCO DX-SR8 and DX-R8 129
General 129
Hardware configuration 130
Radio settings (example) 130
Connections 130
Power supply 131

Schematics 132
I/O and PAD Interface Control-RRC 132
I/O and PAD Interface Radio-RRC 133
MIC/AUX Interface Control-RRC 134
MIC/AUX Interface Radio-RRC 135

Network and Firewalls 136
DMZ 137
Portforwarding 138
SIP ALG 139

Appendix A - Audio coding 140

Appendix B - COM-port Keyer interface 141

Appendix D - Technical Data 142

Appendix E - Safety and Regulatory Information 143
FCC Statement 143
Safety Notice 143
Disclaimer 144
FCC / CE - Declaration of conformity 145

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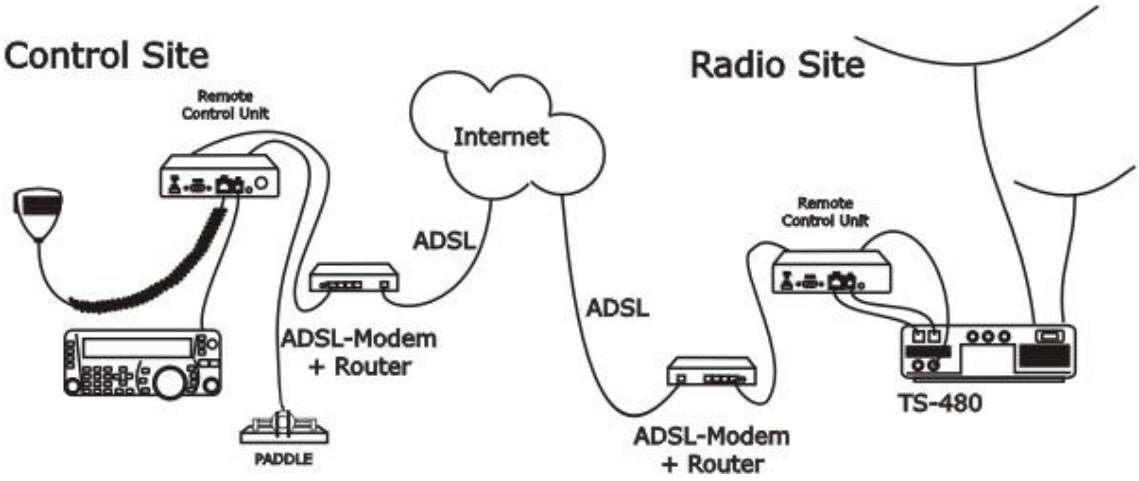
General Description

The Remoterig RRC-1258MkII (RRC) is developed especially for remote control of Amateur radio stations via the Internet in a user-friendly and cost-effective way. The RRC units are used in pairs, one is connected to the radio (Radio-RRC) and the other is connected to the control equipment (Control-RRC). The system is unique in the way that no PC is needed for the voice and data communication it's handled by the two RRC. There are two versions available RRC1258MkII and RRC1258MkIIs, the difference is that the (s) versions handles two audio channels from the radio which is useful together with dual receiver equipment. The Remoterig system can be configured to work together with most Amateur radio stations available on the market from ICOM, Kenwood, Yaesu, Elecraft and Alinco. The Remoterig system fits very well in the following situations:

- You are not allowed to put up antennas at your home.
- The noise level is too high to make Amateur radio activity possible.
- You want to build so big antennas that can't be done in urban areas.
- You do not want to be dependent of PC:s for the remote control.
- Etc.

The Remoterig system itself will not introduce any latency and the latencies introduced by Internet will rarely be any noticeable problem. The Remoterig system also includes a unique solution for operating CW over Internet and it also includes a CW-keyer. The Remoterig system is connected to the Internet primarily via 10 or 100 Mbit Ethernet and fixed connections like DSL, cable and WLAN. 3G based mobile solutions will also work but sometimes with reduced performance. The system is portable and you can use it from almost any network connection in the world. Session control, audio (VoIP) and data is transferred using standardized protocols like SIP, RTP etc. where you can select different audio qualities depending on available bandwidth. The RRC-1258MkII is easily configured via modern USB and WEB based user interfaces.

Detachable control panel



You will get the ultimate function of the Remoterig system together with radio stations with detachable control panels like Kenwood TS-480, Kenwood TM-D710, Kenwood TS-2000, ICOM

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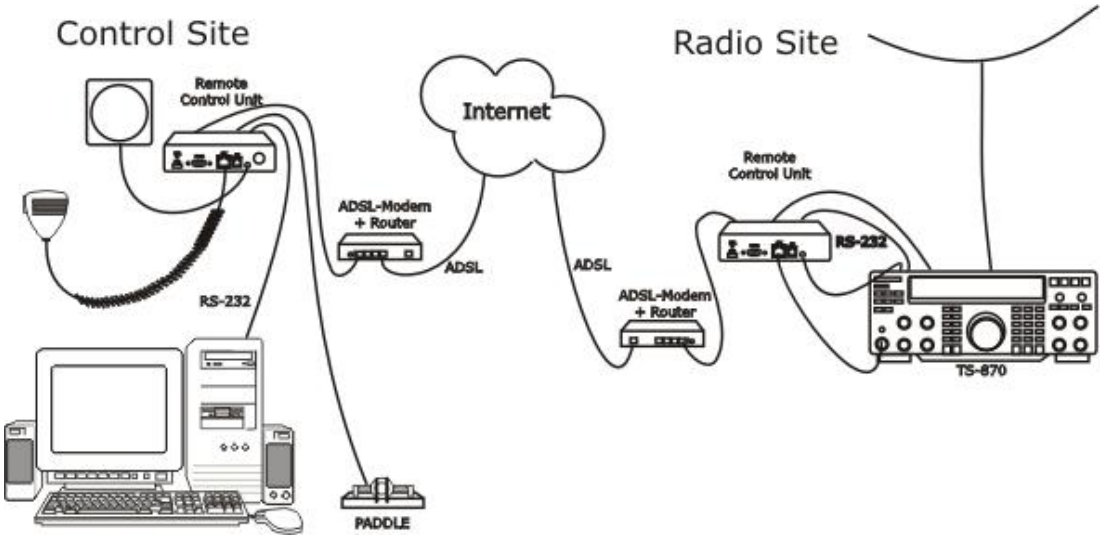
IC-703, ICOM IC-706, IC-2820 and Alinco DX-SR8. You simply replace the cable between the control panel and the radio with the Remoterig system. You will get the same feeling and functionality as with the original setup.

PC-based control



The system also works very well for more traditional remote control from PC-based control software's like HamRadioDeLuxe. The Remoterig system solves the voice and data transmission but you need a PC for the Control software itself in this setup.

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Step by step system setup

Below follows a recommendation about how to proceed when setting up the system.

1. Spend some time to read thru this user manual to get familiar with the product.

2. Apply 12V DC (good stabilized power) to both units.

3. Connect both units with CAT5 patch cables to the same Ethernet switch or router as your PC which you will use to setup the system is connected.

4. Download the Microbit Setup Manager and the latest firmware from http://www.remoterig.com to your PC. Follow the instructions about how to install the Microbit Setup Manager (see chapter Configuration with Microbit Setup Manager).

5. Find out how your network is configured and configure the RRC to fit into your network (see chapter Initial IP Setup) with the Microbit Setup Manager. This has to be done with both units.

6. Check the installed firmware version. If the one you downloaded from Remoterig is newer, update the units with the new firmware. Always update both units to the same version (see chapter FW/HW about how to update).

7. When you have configured the units to fit into your network, Start your Web browser and connect to the units one by one by entering their resp. IP-address. If you get in contact with their internal web server everything is OK.

8. Disconnect all cables from the units and open the housings (see chapter Strappings and jumpers) and make the hardware strapping according to the instruction which is provided in the chapter for your radio in the end of this Users manual. Check the red jumpers with a ohm meter to verify that they are not broken before assembling the housings again.

9. Make the basic software configuration for your system which is described in the chapter for your radio in the end of this Users manual.

10. Prepare the cables needed for your radio station and/or PC according to the cable drawings provided in the chapter for your radio in the end of this Users manual. Double check your home made cables with an ohm meter before connecting them to the RRC and the radio to prevent harm of any equipment. Microbit do not take any responsibility of damaged RRC-units or radio equipment.

11. After preparing the cables connect them to the RRC-units and the radio equipment. Connect the power to all equipment. Check with your web browser again that you are in contact with both RRC-units.

12. Now try to establish the connection between the Control-RRC and the Radio-RRC. If you use a radio with a detached control panel it's done when you press the ordinary power on button. If you are using a PC-at the control end you need to browse to the status page in the Control-RRC and connect by clicking on the "Connect" button on.

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13. When the connection is established, test the functionality. Check that you can hear the receiver audio, check that PTT is working and microphone level is OK to be sure that the strappings are OK.

14. When this basic functionality are OK you can go further connecting cables for CW, rotor control, PA-control etc. Prepare all functions that you need and test them before moving the RRC:s apart to different locations, everything gets much more complicated to test when travelling is needed.

15. When it's time to move the RRC:s apart you need to gather some information about how the network at the remote site is configured. The first thing is to determine if your Internet Service Provider (ISP) are providing you with a fixed or dynamic IP-address. Fixed IP:s are rare so you probably have a dynamic IP-address if you are not paying extra for a fixed one. A dynamic IP is no problem but you need to register a DynDNS account (free) at http://www.dyndns.org. They have services which they are charging money for but the free one has everything you need. Follow the instructions on their website.

16. After moving the RRC-apart you need to connect a PC to the local network at the remote site where the Radio-RRC should be connected and find out how the network is configured (see chapter Initial IP Setup). You have to set up the new IP, Netmask and Gateway. When it's done use your web browser to connect to the Radio-RRC:s internal web server and configure the DNS IP.

17. Configure the Radio-RRC:s DynDNS settings with the Hostname you registered at DynDns (see chapter Dynamic DNS Setting).

18. Now it's time to configure your remote router. We recommend that you first of enable the remote configuring of your router, you may need it later. After that's done configure DMZ or port forwarding (see chapter Network and Firewalls). When this is done your remote Radio-RRC should be reachable over the Internet.

19. When back at the Control QTH try to browse to the DynDNS address you registered and entered into the Radio-RRC. You should get in contact with the Radio-RRC internal web server exactly as it was local.

20. The only setting which need to be changed in the Control-RRC is the SIP-contact at the Radio settings page. The SIP-contact should be changed to the DynDNS Hostname you registered or to the fixed IP of the Radio QTH if you have one. Then everything should work remotely.

Enjoy the remote controlling.

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Hardware

Front

PWR LED

Green light is indicating normal status. When the green LED is flashing the unit is trying to connect to the Ethernet, normally it only takes a few seconds. If the LED do not end flashing it's probably something wrong with the network connection.

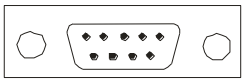
USB

The USB-interface is used to initially set up the IP parameters. It can also be used for downloading new software (can also be done via the WEB-interface). At the Control-RRC it can also be used for PTT or CW control via the RTS and DTR signals in the virtual COM-port delivered by the RRC USB device.

COM1

COM1 can in special cases be used to set parameters and check statuses if USB or WEB cannot be used. The COM1 port can also be used for ex. rotator control as it can be configured as transparent serial port between the RRC:s.

RS-232



Pin no	RS-232 Interface (9-pol D-sub female)
1	
2	TXD (Out)
3	RXD (in)
4	
5	GND
6	

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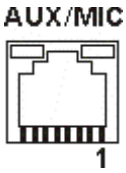
7	CTS (In)
8	RTS (Out)
9	

AUX/MIC

The AUC/MIC connector (RJ-45) is used for microphone connection or for connection of the radio control panel (IC-703/706, DX-SR8). Inside the RRC behind the connector is a set of straps with can be used to decide how the connector should be configured depending on radio or microphone. The red and yellow LED:s are indicating SIP-status:

LED	LED Red	LED Yellow
Off	Incoming audio stream OK	SIP disconnected
Flashing	-	SIP connection failed
On	Incoming audio stream fail	SIP connection OK



Pin no	AUX (RJ45)
1	depends on the inside straps
2	depends on the inside straps
3	depends on the inside straps
4	depends on the inside straps
5	depends on the inside straps
6	depends on the inside straps
7	depends on the inside straps
8	depends on the inside straps

TTL Control-RRC

The TTL connector on Control-RRC (RJ-12) is used primary for connection of the radio control panel (TS-480, RC-2000 and IC-E2820) and in other cases where you need to connect via a TTL level (5V) port. The connector is configured so a straight cable can be used to a TS-480 and RC-2000 control panel.

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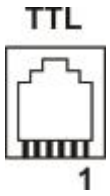
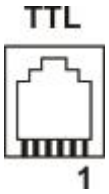


Pin no	AUX (RJ45)
6	AF output, Speaker 2W/8 ohm
5	TDO input, data from panel to radio (TTL)
4	RDO output, data from radio to panel (TTL)
3	GND
2	8V output, always active
1	GND

TTL Radio-RRC

The TTL connector on Radio-RRC (RJ-12) is used for connection of the cable which is normally connected between the control panel and the radio (TS-480, RC-2000, and IC-2820). It's also used for CAT control of radios with 5V.s inputs e.g. all ICOM with 3.5mm C-IV connector and FT-8x7 with the mini DIN-connector. The connector is configured so a straight cable can be used to a TS-480 control panel and to RC-2000.



Pin no	AUX (RJ45)
6	AF Input (TS-480)
5	TDO input, data to radio (TTL)
4	RDO output, data to radio (TTL)
3	GND
2	8V output, always active
1	GND

SP Control-RRC

At the Control-RRC the connector is used as a speaker output. It's connected in parallel with the audio output pins in the MIC/AUX and TTL connectors. The connector is a standard 3.5 mm jack for a mini stereo plug and there is no switch in the connector. The speaker output power is 2W at 8 ohm. In the dual RX (stereo) version there are signals from both the Main-RX and Sub-RX available in the SP-connector. There is only a Lf power amplifier on the Main RX signal so I recommend that you set jumper JMP-4 in the Headset position and use headset

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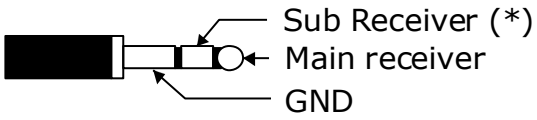
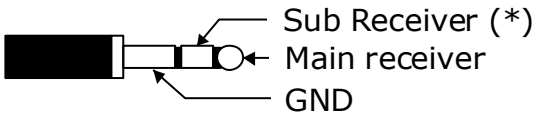
or Stereo speakers with built in lf-power amplifier if you use a Dual Receiver system. PC-type speakers are very well suited for this.



(*) Sub receiver, only available in RRC-1258MkIIs version

SP Radio-RRC

At the Radio-RRC the speaker connector is an input for the speaker signals from the radio. The Dual-Rx version has inputs for both the Main-Rx and Sub-RX. The Main-Rx input is connected in parallel with the input pins in the MIC/AUX and TTL connector. The inputs has resistive loads of 50 ohms. The connector is a standard 3.5 mm jack for a mini stereo plug and there is no switch in the connector.



(*) Sub receiver, only available in RRC-1258MkIIs version

CW Control-RRC

The CW knob is used for adjusting the CW-speed of the built in CW-keyer. There is no knob on the Radio-RRC.

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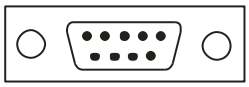
Back

COM2 Control-RRC

COM2 is used to connect to a PC COM port (RS-232). It has a female connector which makes it possible to use a straight cable between RRC and PC. The communication parameter is set via the web interface.

RS-232

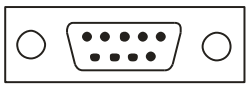


Pin no	RS-232 Interface for PC connection (9-pol D-sub female)
1	
2	RXD (out) to PC RXD
3	TXD (in) from PC TXD
4	
5	GND
6	
7	RTS - connected to JMP-3
8	CTS - connected to JMP-3
9	

COM2 Radio-RRC

COM2 is used to connect to a Radio with RS-232 port. It has a male connector, which makes it possible to use a straight cable between RRC and the radio. The communication parameter is set via the web interface.

RS-232



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Pin no	RS-232 Interface for Radio connection (9-pol D-sub male)
1	
2	RXD (in) to pc RXD
3	TXD (out) from pc TXD
4	
5	GND
6	
7	RTS - connected to JMP-3 (*)
8	CTS - connected to JMP-3 (*)
9	

(*) Both Kenwood and Yaesu transceivers need the RTS and CTS pins to be strapped together. JMP-3 inside the box can be used to strap them if you want to use a standard fully connected cable.

PAD Control-RRC

At the Control-RRC the input is used to connect a CW-paddle. The input is for a standard 3.5 mm stereo plug. Normally the left paddle is connected to the tip and the right paddle to the ring. Common is connected to the inner ring and ground. Note that the CW-Keyer function must be enabled to activate this function.

PAD Radio-RRC

At the Radio-RRC the output is used to connect the output signal from the CW-keyer to the radio straight KEY input. The output is for a standard 3.5 mm stereo plug. A standard cable with 3.5 mm connector in both ends can often be used. Note that the OUT1 mode or OUT2 mode must be set to Keyer to activate this function.

PWR

The RRC is powered via the PWR connector (2.1/5.5 mm) with 10-18 VDC.

Radio	Control-RRC (12 VDC)	Radio-RRC (12 VDC)
IC-706	up to 600mA, depending on back lighter and audio volume	max 160 mA (110mA 10Mbit)
TS-480	up to 500mA, depending on audio volume	max 160 mA (110mA 10Mbit)
RS-232	up to 400mA, depending on audio volume	max 160 mA (110mA 10Mbit)

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12V DC

Pin no	PWR
+	+ 10-18 VDC (centre)
-	GND

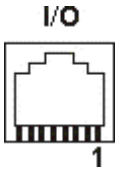
RESET

A short press on the reset switch will reboot the unit. By pressing and keep the button pressed for 20 sec the unit reset to factory default settings with the following network settings:

Control-RRC IP-address: 192.168.0.227
Radio-RRC IP-address: 192.168.0.228
Netmask: 255.255.255.0
Gateway: 192.168.0.1
DNS: 192.168.0.1

I/O

In the I/O connector is 3(2) inputs and 3 outputs, 8V and GND available (see below). The connector is used for transferring signals from one RRC to the other. If the CW-keyer function is not used the connector can be used for whatever controls signals needed in both directions. The output transistor can sink max 200mA so install an external relay if it's not strong enough.



Pin no	I/O (RJ45)
1	IN1, active low (CW-Keyer right-paddle)
2	IN2, active low (CW-Keyer left-paddle)
3	OUT1, open collector
4	IN0, active low (only available at Control-RRC)
5	OUT0 open collector
6	OUT2 open collector
7	8V OUT (max 100mA)
8	GND

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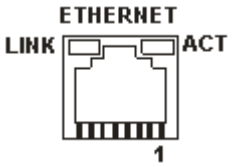
ETHERNET

The unit can be connected to both 10 and 100 Mbit/s Ethernet based TCP/IP network. The RRC can be configured for different connection types for Ethernet port, Auto, 10HDX, 10FDX, 100HDX, 100FDX and Auto-with-preferred-10FDX. Default is Auto-with-preferred-10FDX which works best in most cases.



Pin no	Ethernet (RJ45)
1	Out [+]
2	Out [-]
3	In [+]
4	
5	
6	In [-]
7	
8	
LINK	Green LED indicates link OK flashing LED indicates traffic
ACT	Yellow LED indicates speed = 100Mbit/s (off = 10MBits/s)

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Strapping and jumpers

Before connecting the RRC to your radio you need to put some straps in place depending on your radio. Down below follows instructions of how to disassembly the RRC and pictures showing where to find the different straps.

1:
Start with removing the screws holding the D-sub on the rear marked COM2. The tool should be 5 mm (3/16").

2:
Open the box by pressing the D-sub until you can get your fingers behind the edge of the lid and can slide the housing apart.

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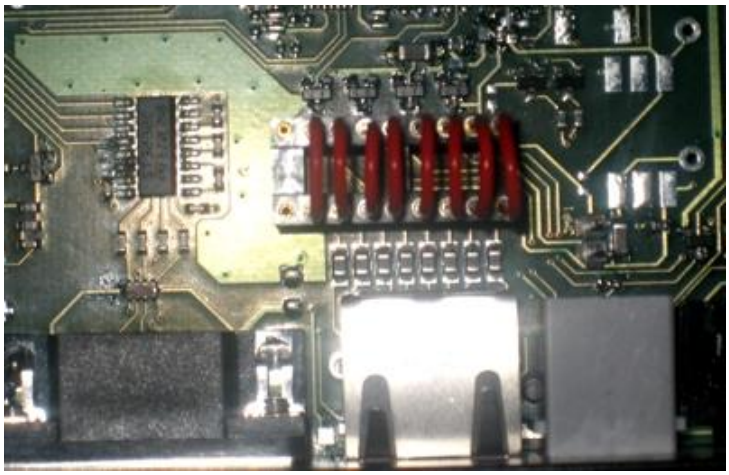
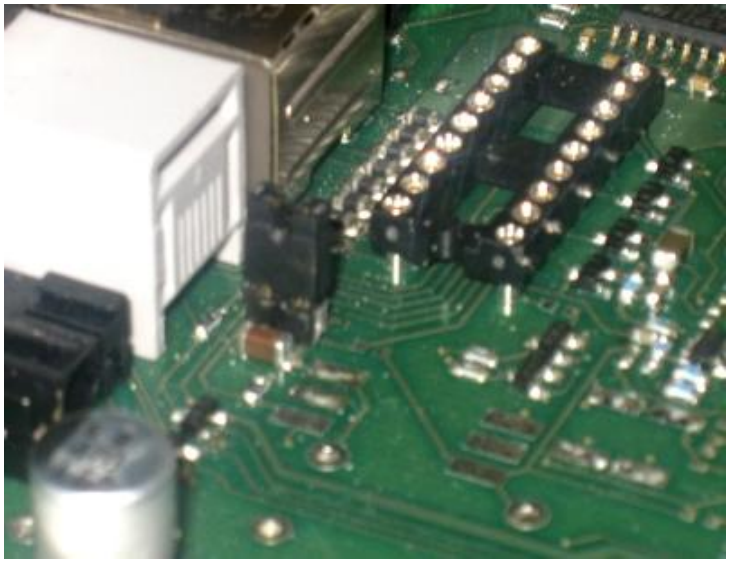
3:
Behind the AUX/MIC connector there is a strapping area which looks like an IC-socket. There are two rows with 9 holes. The row next to the AUX/MIC connector is connected to the connector. The strapping is done by connecting the red strap wires, supplied with the RRC, between the holes according to the description for the radio (see radio chapter). Normally the same strapping should be done in both Control-RRC and Radio-RRC. (The picture shows the strapping for IC-706).



4:
Control-RRC only: JMP-1 is placed behind the TTL connector. With the strap in place a DC voltage is feed to the microphone element. All ICOM microphones should be DC-feed. Dynamic microphones like the ones used by Kenwood should not be DC-feed. HEIL microphones should not be DC-feed either.



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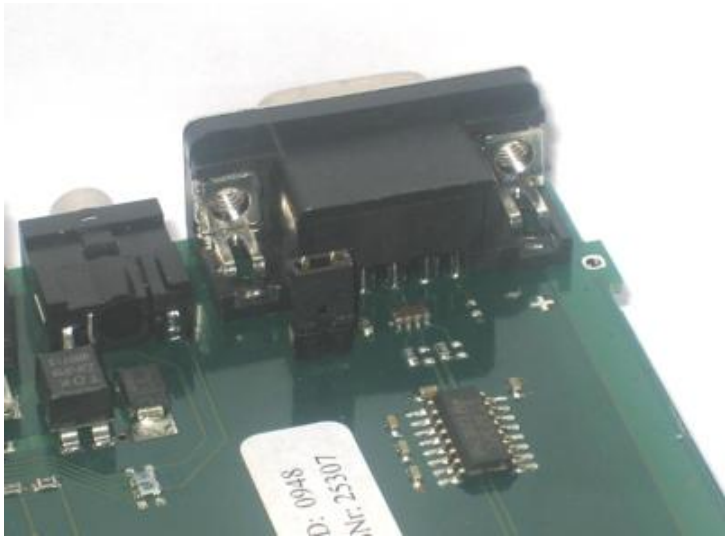
5:
Control-RRC only: JMP-2 is placed near the back of the RRC next to the RESET button. JMP-2 is used to select if the DC-power to the front panels should be 8 or 9 V. With the strap in place it will be 8V, which fits all ICOM radios. Without the strap the voltage will be 9V, which fits Kenwood TS-480 and RC-2000 panels that need 9V for the back-lighter.

6:
JMP-3 is placed next to the rear D-sub COM2. JMP 3 is used to connect RTS and CTS together (pin 7 and 8) in COM2. Most of the Yaesu and Kenwood radios with RS-232 port need to have them tied together. This is convenient if you want to use a prefabricated fully connected cable.



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7:
JMP-4 is placed behind the CW-pot, and is available only in the Control-RRC. JMP-4 is used to select between Speaker level or Headset level for the Main-Rx output. The Sub-Rx is always Headset level. (JMP-4 is only present in the RRC-1258MkIIs version)

8:
When you are done you can slide the lid on the bottom part and put back the screws. Be careful the threads do not stand to much force.

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Configuration with Microbit Setup Manager

The initial settings of the network parameters are easiest done with the RRC-Manager. The RRC-Manager is a software which runs under Windows on a PC and connects to the RRC via USB (an USB cable is supplied with the RRC). RRC-Manager can be used for:

- IP Settings and verification
  - IP-address
  - Netmask
  - Gateway
  - DHCP
- Firmware upgrade
  - Application
  - Bootloader

Start with downloading the RRC-Manager from the homepage www.remoterig.com. Install the RRC-Manager by following the instructions which shows up. If you have an older Windows version where Netframework 2.0 is not installed, the installer will guide you through the installation of Netframework. When you have finished the installation a new shortcut to RRC-Manager will show up on the desktop. Click on the icon to start RRC-Manager

Connect your RRC to 12V and connect the USB-cable between your computer and the USB jack on the front of the RRC. Windows will automatically install the necessary drivers. When it's done the text in the bottom field will change from "RRC not connected" to "RRC-connected" which is an indication that you are in connection with the unit.

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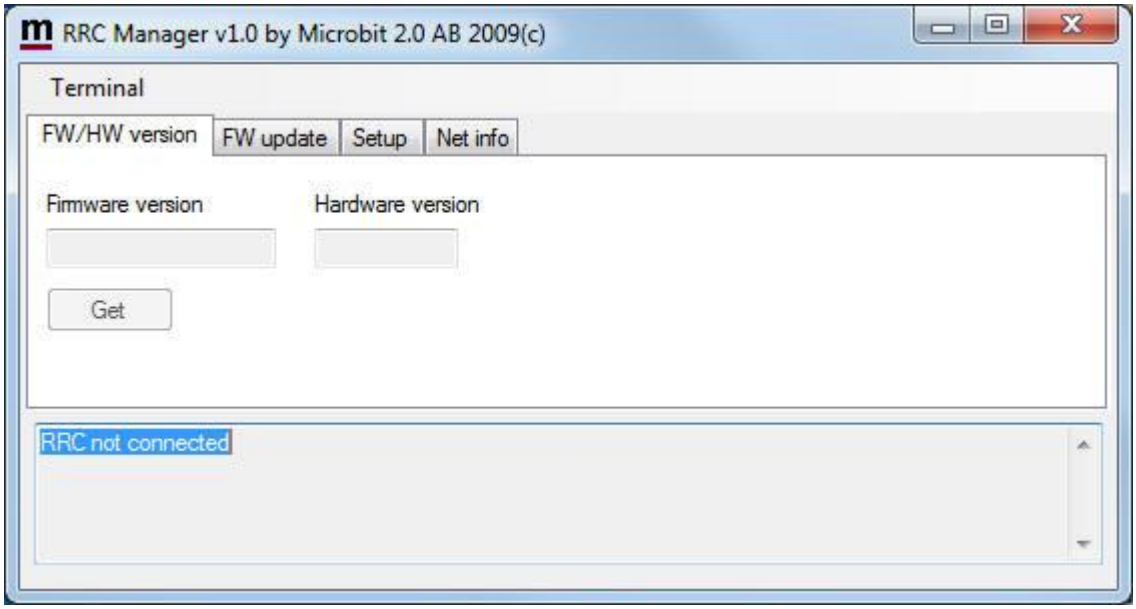
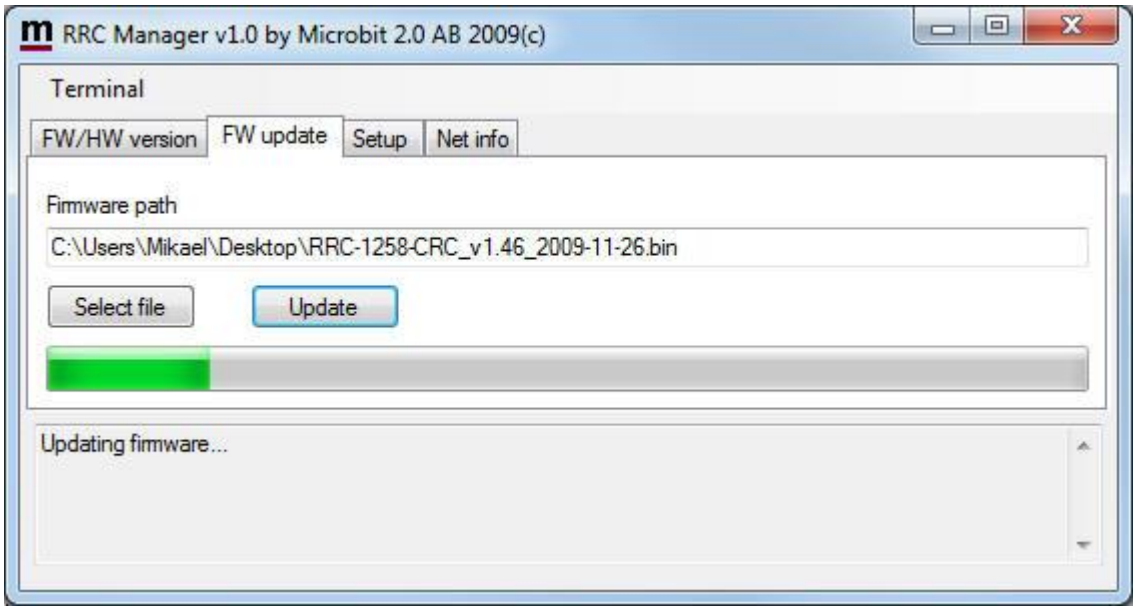
FW/HW



Click on the "Get" button and the version of the firmware will show up in the upper window. Go to the page www.remoterig.com and under downloads you can find the latest firmware. If there is a newer firmware available download it to your desktop and change to the "FW-update" tab.

FW update



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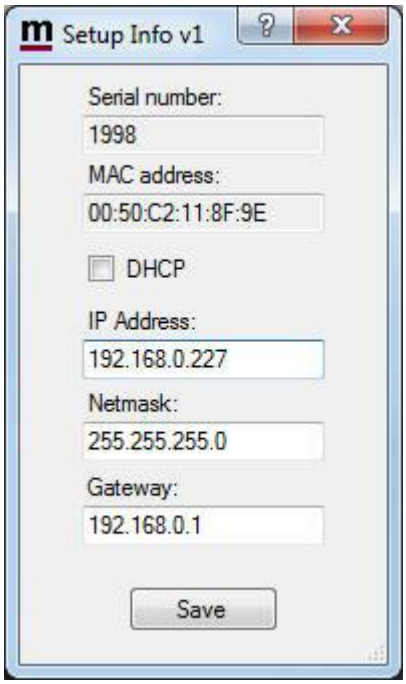
Click on the "Select file" button and browse to the file with the new firmware, it should be something like "RRC-1258-CRC_v1.46_2009-11-26.bin" depending on the version and release date. When you have selected the file click on the "Update" button and the update process will start, the text in the bottom field will change to "Updating firmware". Attention -- Do not interrupt the update process in any way!

After about a 1 minute the update is finished and the RRC will restart. When the text "RRC-connected" shows up again in the lower field of the RRC-Manager, you can change to the "FW/HW" tab and check software version.

Setup



A new window wills pop-up with the basic IP settings. Change the settings so they fit into your local network and press the "Save" button to save the new settings. The RRC will restart again and when the text "RRC-connected" shows up again in the lower field of the RRC-Manager, you can click on the "Setup" button again to verify the changes.

Net info

Click on the "Get" button to read the IP setting currently in use by the RRC.

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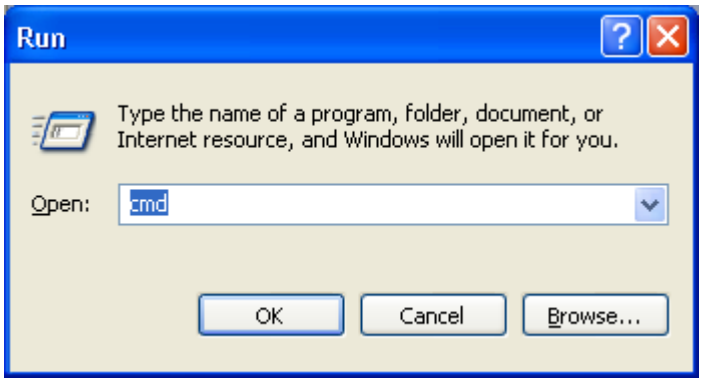
Initial IP setup

The default Ip settings from the factory is 192.168.0.227 (Control-RRC) and 192.168.0.228 (Radio-RRC). The net mask is 255.255.255.0. and the gateway 192.168.0.1.

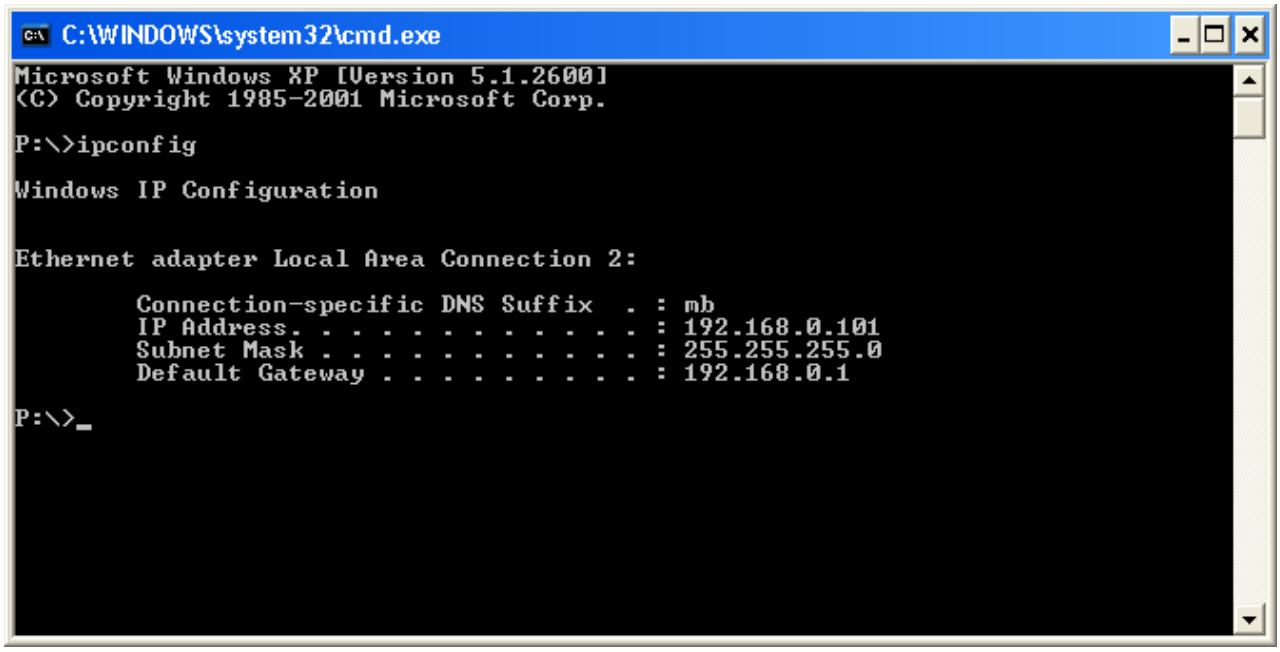
To be able to contact the RRC-units via the network you must configure the units to fit into your home network. You can check your network configuration from your PC.

On the start menu select Run. In the Run dialog box enter cmd.



You will get a DOS-window.

At the DOS-promt enter ipconfig.


C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
P:\>ipconfig
Windows IP Configuration
Ethernet adapter Local Area Connection 2:
Connection-specific DNS Suffix . : mb
IP Address. . . . . : 192.168.0.101
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.0.1
P:\>

Then you will get the needed information:

Your PC IP address in this example is 192.168.0.101 this means that the IP of the RRC:s must have IP:s in the area 192.168.0.2 to 192.168.255.

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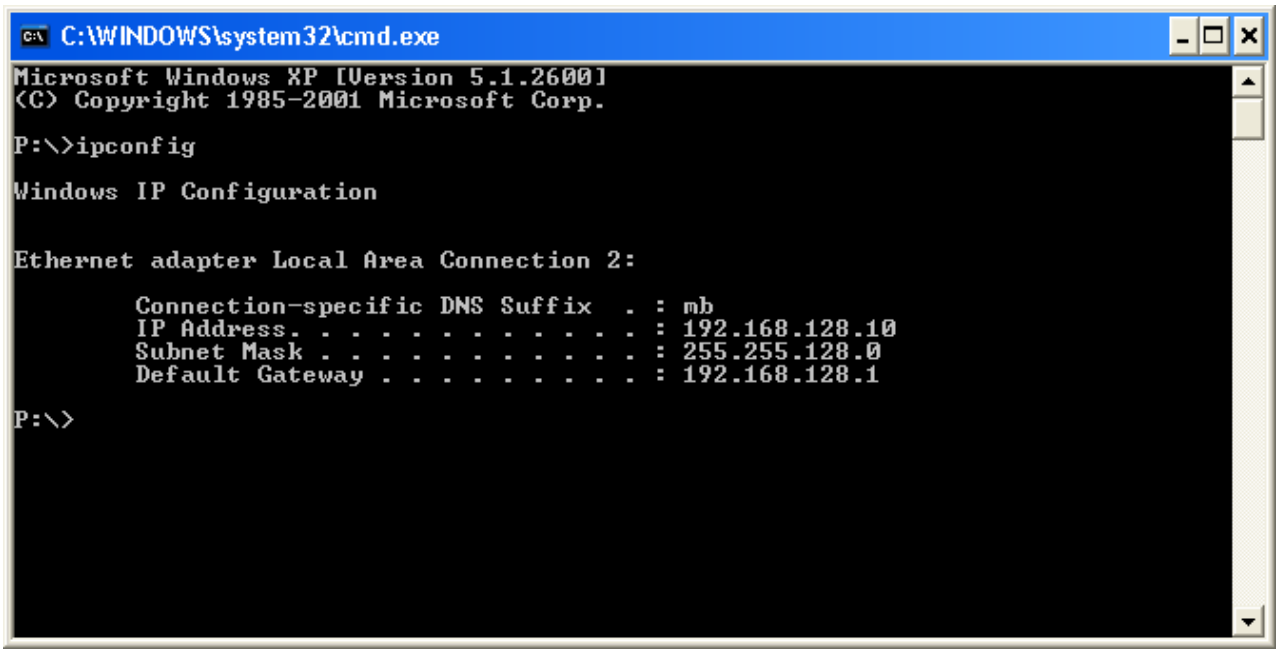
The Netmask is 255.255.255.0 the Netmask in the RRC:s should be the same

The Default gateway is 192.168.0.1 the Gateway in the RRC:s should be the same

In this case all the default IP setting will be OK.

In an other network, this is the result of the ipconfig command.


C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
P:\>ipconfig
Windows IP Configuration
Ethernet adapter Local Area Connection 2:
Connection-specific DNS Suffix . : mb
IP Address. . . . . : 192.168.128.10
Subnet Mask . . . . . : 255.255.128.0
Default Gateway . . . . . : 192.168.128.1
P:\>

Your PC IP address in this example is 192.168.128.10 this means that the IP of the RRC:s must have IP:s in the area 192.168.128.2 to 192.128.255.

The Netmask is 255.255.128.0 this the Netmask in the RRC:S should be the same

The Default gateway is 192.16.128.1 the Gateway in the RRC:S should be the same

In this case you must change the IP:s of the RRC. I recommend to use 192.168.128.227 and 192.168.128.228

Use the Microbit Setup Manager to change the IP settings.

Select the Setup tab click on the "Get Setup" button and enter the IP addresses in the Setup info dialog box.

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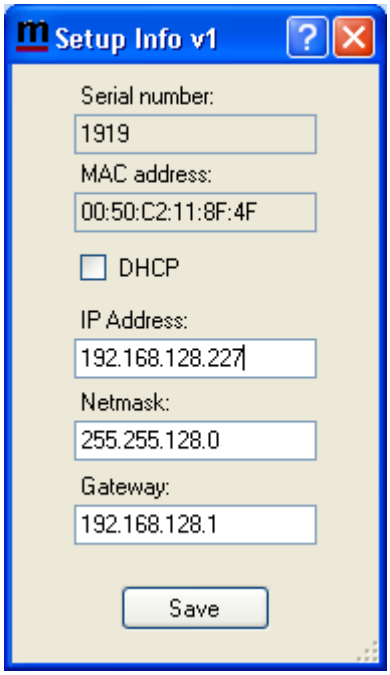

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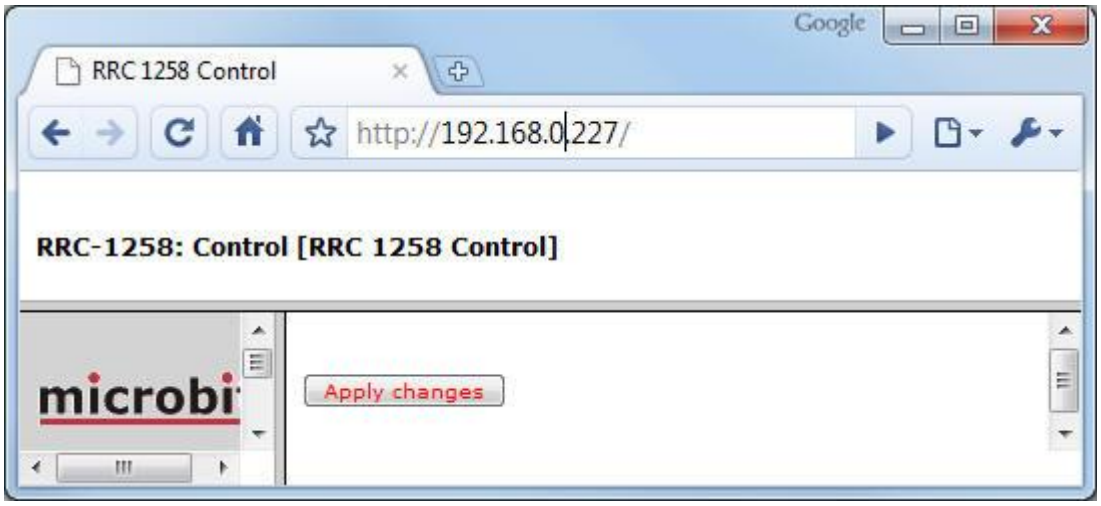
Configuration with WEB-interface

Before you can use your RRC-1258MkII you must configure both the hardware (strapping) and the software settings. The units will have the default IP addresses 192.168.0.227 (Control-RRC) and 192.168.0.228 (Radio-RRC). The net mask is 255.255.255.0. The configuration is easiest done via the web interface. Be aware of that your PC must be in the same net e.g. having an IP-number between 192.168.0.2 and 192.168.0.254 and not be the same as the RRC. If the default IP-addresses of the RRC not fit your network please use the PC-program RRC-Manager to change the IP-addresses via USB. It's convenient to use DHCP at the Control-RRC but wait to active DHCP until everything is setup and working.

Select setup page from the links on the left side and edit the parameters. After each setup pages is finished press Submit to temporary store the new settings. When you do that a new red Apply changes button appears on the pages. You can now change parameters on other pages but the new settings will not take effect until you press Apply changes. When you do that the unit will reboot and start up with the new settings. If you change your mind after clicking on submit you can click on Restart device on the left to restart the device without changing any settings.



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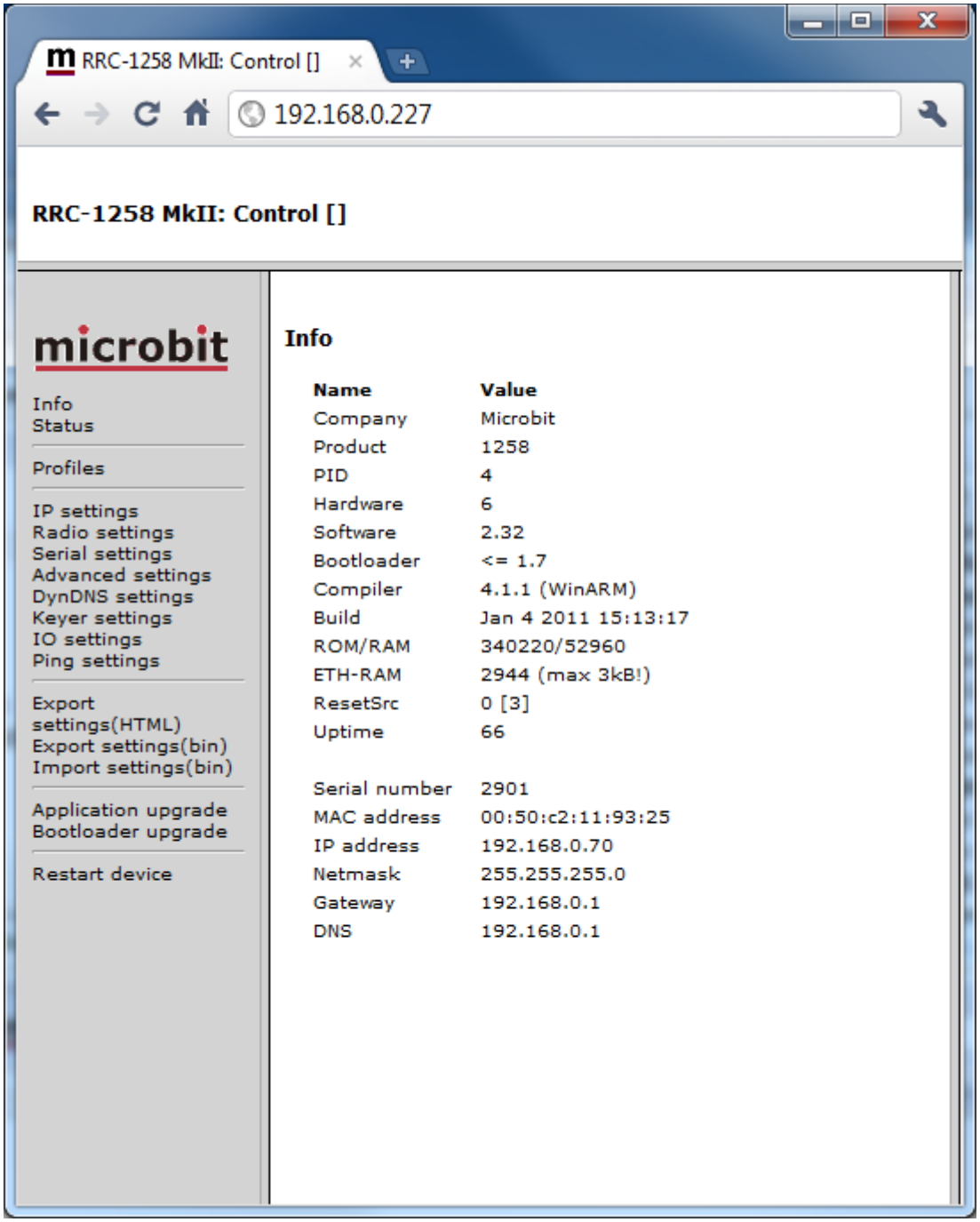
Info

The info page shows some static information about the RRC as firmware revision etc. and also the basic IP-configuration.



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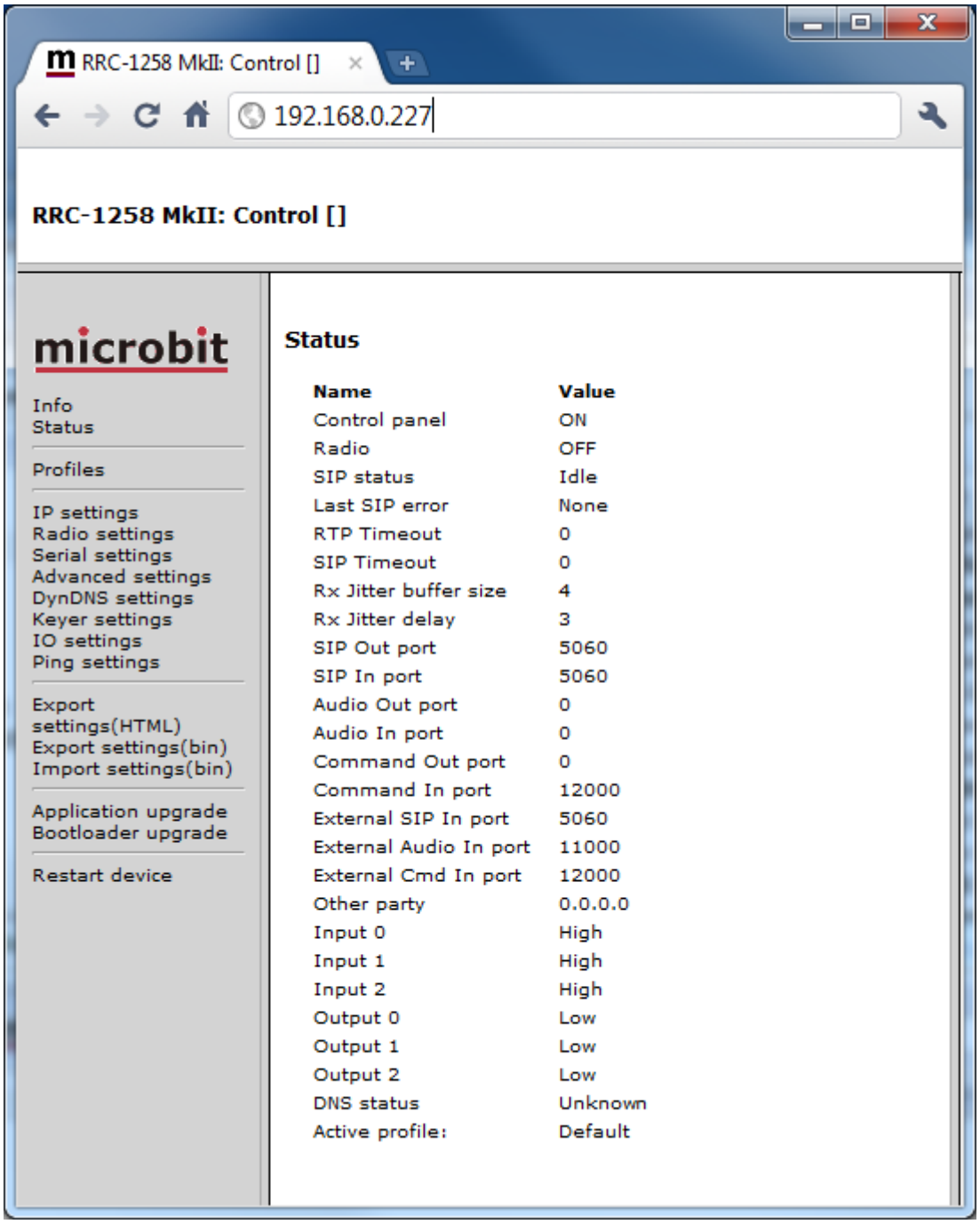
Status

On the status page you can check some parameters which can be useful when debugging etc. But the most important is that here is the "Connect" and "Disconnect" button used to connect or disconnect the Internet connection between the two RRC. When connecting you will see how the SIP-status is changed to "Connected/Transferring" if everything is OK. Here is also shown how your NAT-router has mapped the ports and the momentary status of the inputs and outputs.



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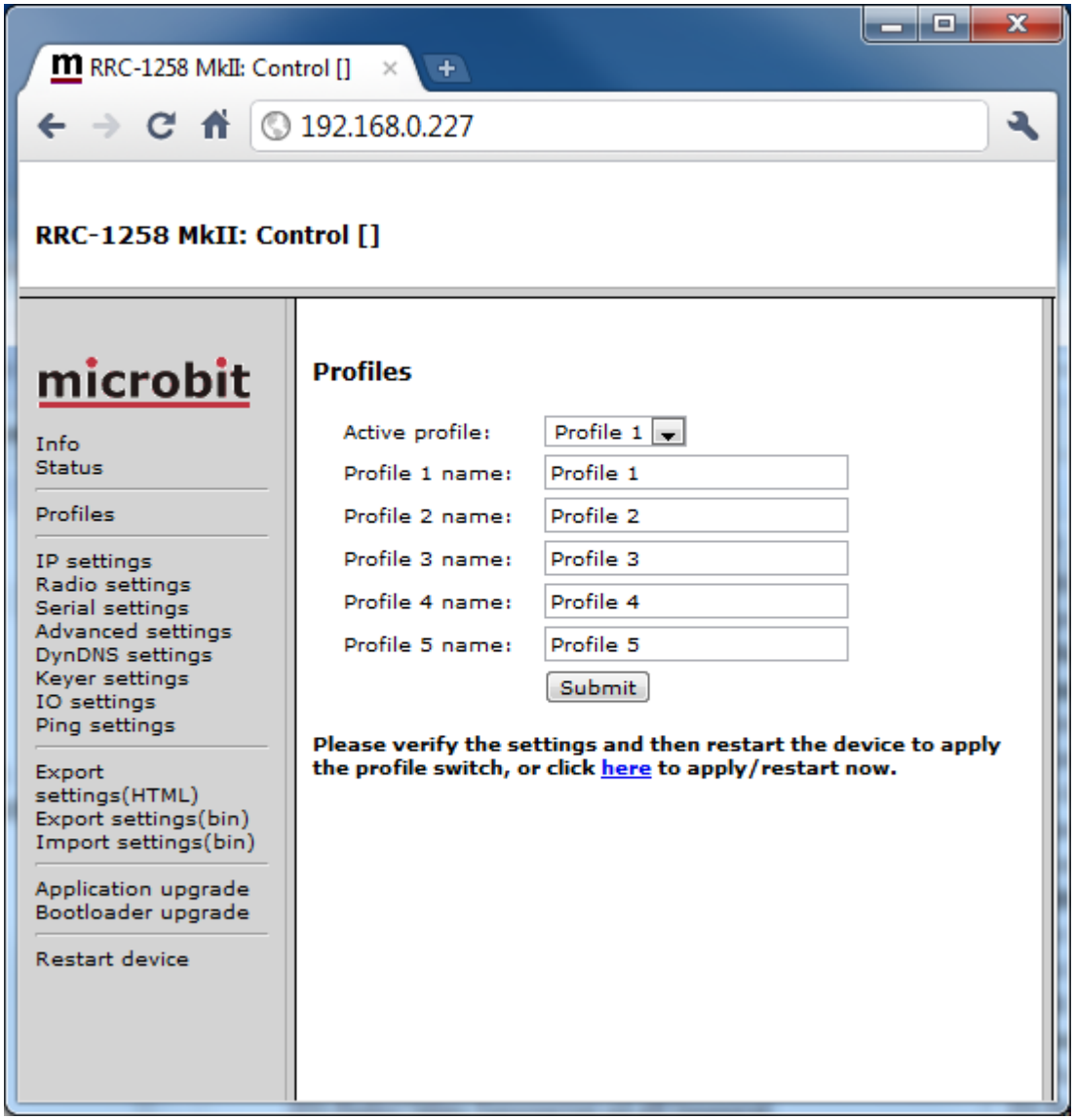
Profiles

The profile menu is used to store and load settings profiles. This could be convenient if you change settings often. But **NO** settings are needed here if you do not use it, so leave this page to later if it's your initial setup of the RRC:s.



You can use up to five profiles and you can give them describing names.

The first time you activate another profile than the default profile the default profile will be copied to the other profiles.

When you save settings in the normal way with the red "apply settings" button the data will be saved in the profile which is active for the moment.

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To change profile just select "Active profile" to the profile you want to change to, and press submit. The new profile will then be loaded but will not be used before restart so you can check all settings and the restart to make the new profile active.

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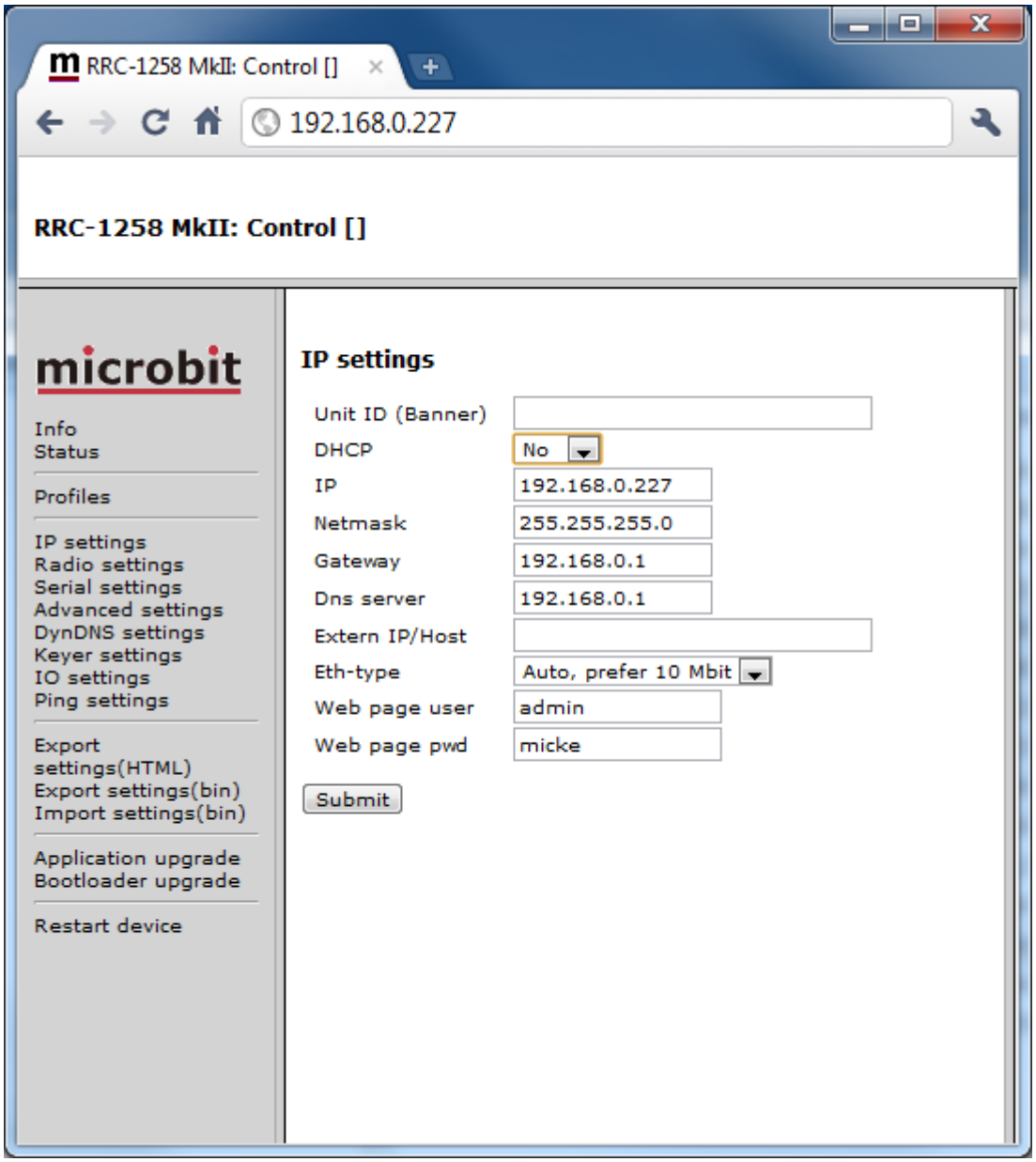
IP Settings

The IP Settings menu is used to setup the initial IP parameters needed for the unit to connect to the IP network. Down below the settings are described more in details.



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Parameter	Setting
Unit ID (Banner)	Text, whatever you want, that will be shown at the top of the web-page (within brackets). Used to identify different RRC. "empty" (default) "text"
DHCP	Select between a fixed IP address and DHCP. DHCP can be practical for the Control-RRC but fixed IP address is preferred in Radio-RRC. No (default) Yes
IP	IP-address (only when fixed IP-address is used) 192.168.0.227 (default Control-RRC) 192.168.0.228 (default Radio-RRC) nnn.nnn.nnn.nnn
Netmask	Net mask (only when fixed IP-address is used) 255.255.255.0 (default) nnn.nnn.nnn.nnn
Gateway	Gateway (only when fixed IP-address is used) 192.168.0.1 (default) nnn.nnn.nnn.nnn
Dns server	DNS-address (only when fixed IP-address is used) 192.168.0.1 (default) nnn.nnn.nnn.nnn
Extern IP/Host	Fixed external IP-address of your NAT-router. Should NOT be used in normal installations. "empty" (default) nnn.nnn.nnn.nnn
Eth-type	Type of Ethernet connection: Auto Auto, prefer 10 Mbit (default) 10HDX* 10FDX* 100HDX* 100FDX* Auto prefer 10 Mbit is default as more speed is not needed and the emissions from a 10 Mbit LAN is much less than from a 100 Mbit LAN (*) If you use fixed settings you must have a managed switch where you can set the same setting.

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Web page user	Enable password protection for the web pages and also the telnet connection by entering a username (this field) and a password (next field). If this field is empty the RRC will not ask for password. Some of the pages are still accessible but no editing is possible. "empty" (default) "username"
Web page pwd	Password for the web pages and telnet connection. "empty" (default) "password"

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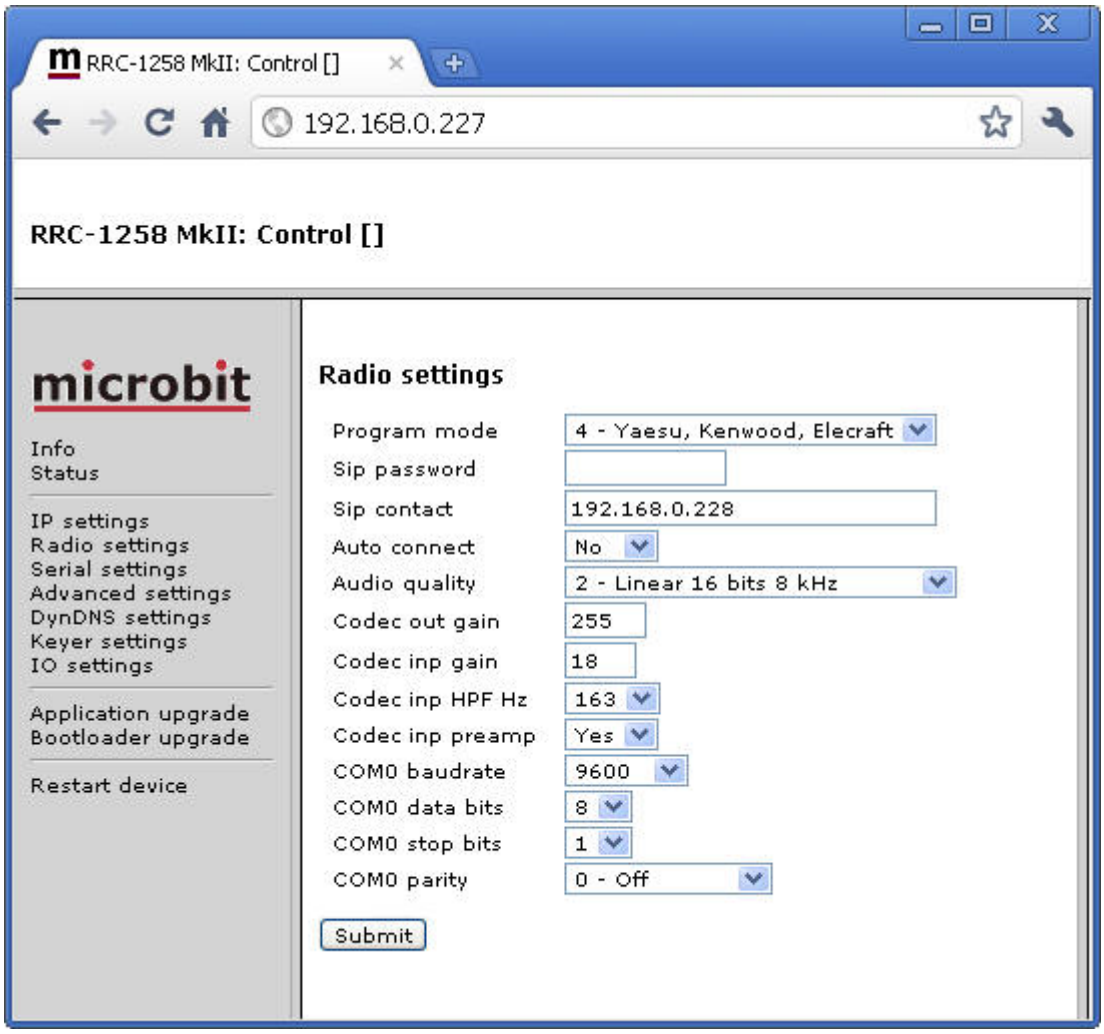
Radio Settings

The Radio settings are used to setup the RRC to act together with different radios. The settings must be done in both Control-RRC and Radio-RRC and the parameters are partly different for the both RRC.



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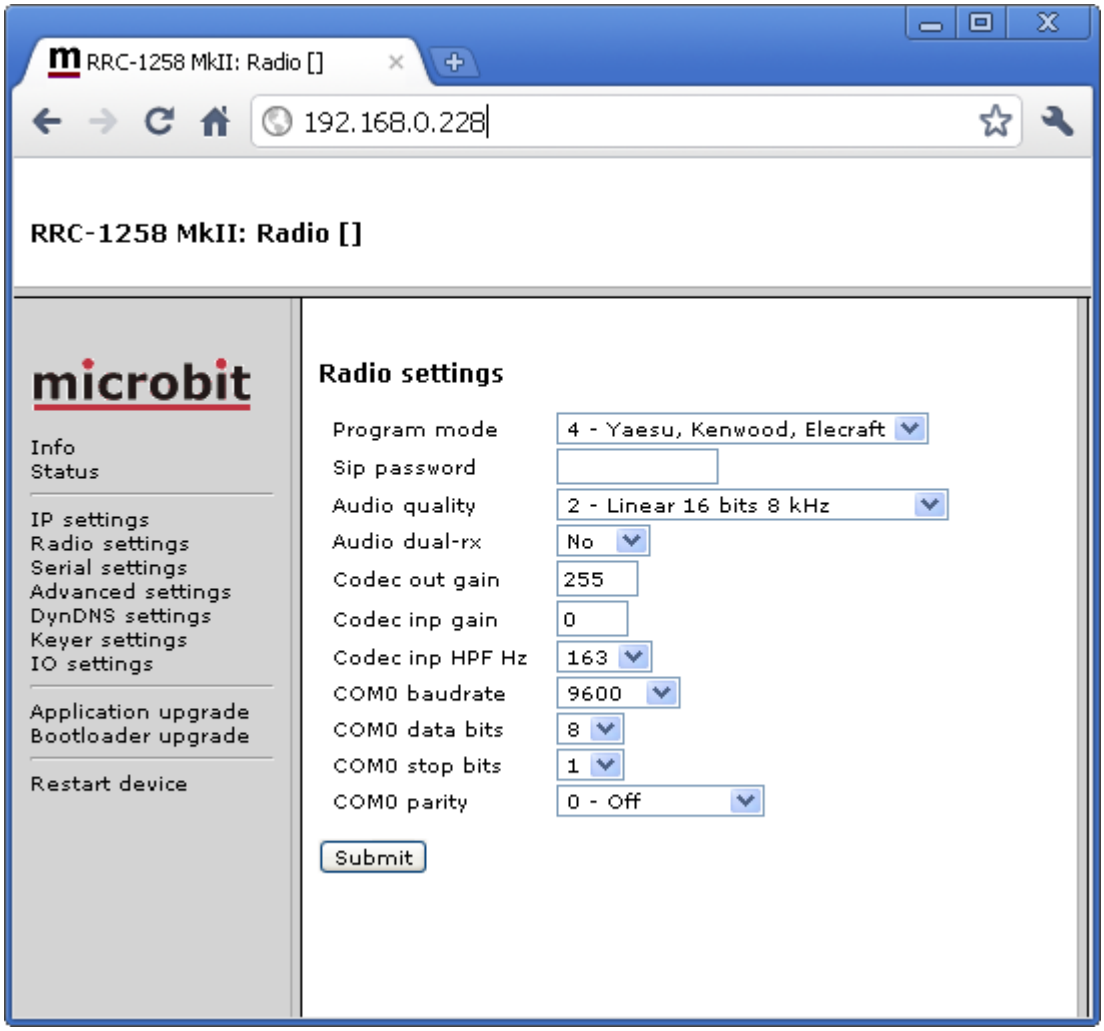

Parameter	Setting

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Program mode	Select the program mode depending on connected radio: 0 = Transparent (for repeater links etc.) 1 = ICOM CI-V (generic) 2 = IC706 (with detached control panel) 3 = FT-8x7, FT-1000 4 = Kenwood, Yaesu, Elecraft 5 = TS480/TM-D-710 (with detached control panel) 6 = (*1) 7 = IC-R2500 (with detached control panel) 8 = TS2000 (with RC-2000 control panel) 9 = IC-2820 10 = Yeasu FT-950/FT-2000/FT-5000/…. Twin(*2) 11 = Transparent, 4-wire (for repeater links etc.) 12 = DX-SR8 (*1) These selections are only possible in special editions of the RRC. (*2) Only available in the Yaesu Twin version.
Sip password	Protect your remote rig and should be same in both ends. (default: no password)
Sip contact	Control-RRC: Sets the fixed IP address or the DynDNS host name to the Radio-RRC
Auto connect	Control-RRC: When enabled the Control-RRC will connect to Radio-RRC immediately after power up in program mode 0, 1, 3 and 4. No (default) Yes
Sip realm	Radio-RRC: Not used yet.
Audio quality	Sets the audio quality depending on available bandwidth. Sample rate must be same in both RRC but coding can be different (more information can be found in appendix-A Audio coding): 0 = A-law 8 kHz 1 = Linear 12 bits 8 kHz 2 = Linear 16 bits 8 kHz (default) 3 = A-law 12 kHz 4 = Linear 12 bits 12 kHz 5 = Linear 16 bits 12 kHz 6 = A-law 16 kHz 7 = Linear 12 bits 16 kHz 8 = Linear 16 bits 16 kHz 9 = A-law 24 kHz 10 = Linear 12 bits 24 kHz 11 = Linear 16 bits 24 kHz 12 = IMA ADPCM 4 bits 8 kHz 12 = IMA ADPCM 4 bits 16 kHz

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Audio Dual-RX	Sets if LF from the Sub-RX should be sent as an separate audio channel. Be aware of that this doubles the need of Bandwidth. (Only available in the (s) version.)
Codec out gain	Sets the attenuation for the audio output, in 255 steps and 0.5 dB per step. Should always be set to 255. 255 = no attenuation (default) 254 = -0.5 dB 253 = -1.0 dB … 0 = max attenuation
Codec inp gain	Sets the gain for the audio input in 63 steps and 0.75 dB per step. Should be 18 at Control-RRC for high level electret microphones and should always be 0 at Radio-RRC. 0 = default Radio-RRC … 18 = default Control-RRC … 63 = max value
Codec inp HPF Hz	Sets the low cut frequency for the audio passband [Hz]: 82 102 131 163 (default) 204 261 327 408 The upper cut frequency is set automatically depending on the sampling rate.
Codec inp preamp	Control-RRC: Enables a +20 dB pre-amplifier for the audio input at the Control-RRC: No Yes (default)
COM0 baudrate	Set COM0 baudrate for the radio communication [bps]: 1200 2400 4800 9600 (IC-R2500) 19200 (IC703/706) 38400 (IC2820,DX-SR8) 57600 (TS480, TS2000)

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COM0 data bits	Set COM0 data bits: 5 6 7 8 (default)
COM0 stop bits	Set COM0 stop bits: 1 (default) 2
COM0 parity	Set COM0 parity: 0 = Off (default) 1 = Odd 2 = Even 3 = Forced-1 4 = Forced-0

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Serial Settings

The serial ports COM1 and COM2 can be used as a transparent serial channel between Control-RRC and Radio-RRC over Internet. The COM-ports can be used for CAT control, rotator control etc. COM1 is always free to be used with the drawback that you cannot use COM1 for configuration. COM2 is used for the radio control in some of the program modes and can then not be used as a transparent serial channel.

Radio settings / Program mode	**COM1 free channel**	**COM2 free channel**
0 - Transparent	yes	yes
1 - ICOM CI-V	yes	no
2 – IC706	yes	yes
3 – FT-8x7, FT-1000x	yes	no
4 – Yaesu, Kenwood, Elecraft	yes	no
5 – TS480/TM-D710	yes	yes
6 – (*)	yes	yes
7 – IC-R2500	yes	yes
8 – TS2000	yes	yes
9 – IC-2820	yes	yes
10 – Yeasu FT-950/FT-2000 /FT-5000/FT-9000 Twin	yes	no
11 – Transparent, 4-wire(*1)	yes	yes
12 – DX-SR8	yes	yes

COM1 and COM2 mode can be configured differently depending on what they will be used for. The same settings must be done in both Control-RRC and Radio-RRC.

(*1) = Need special hardware

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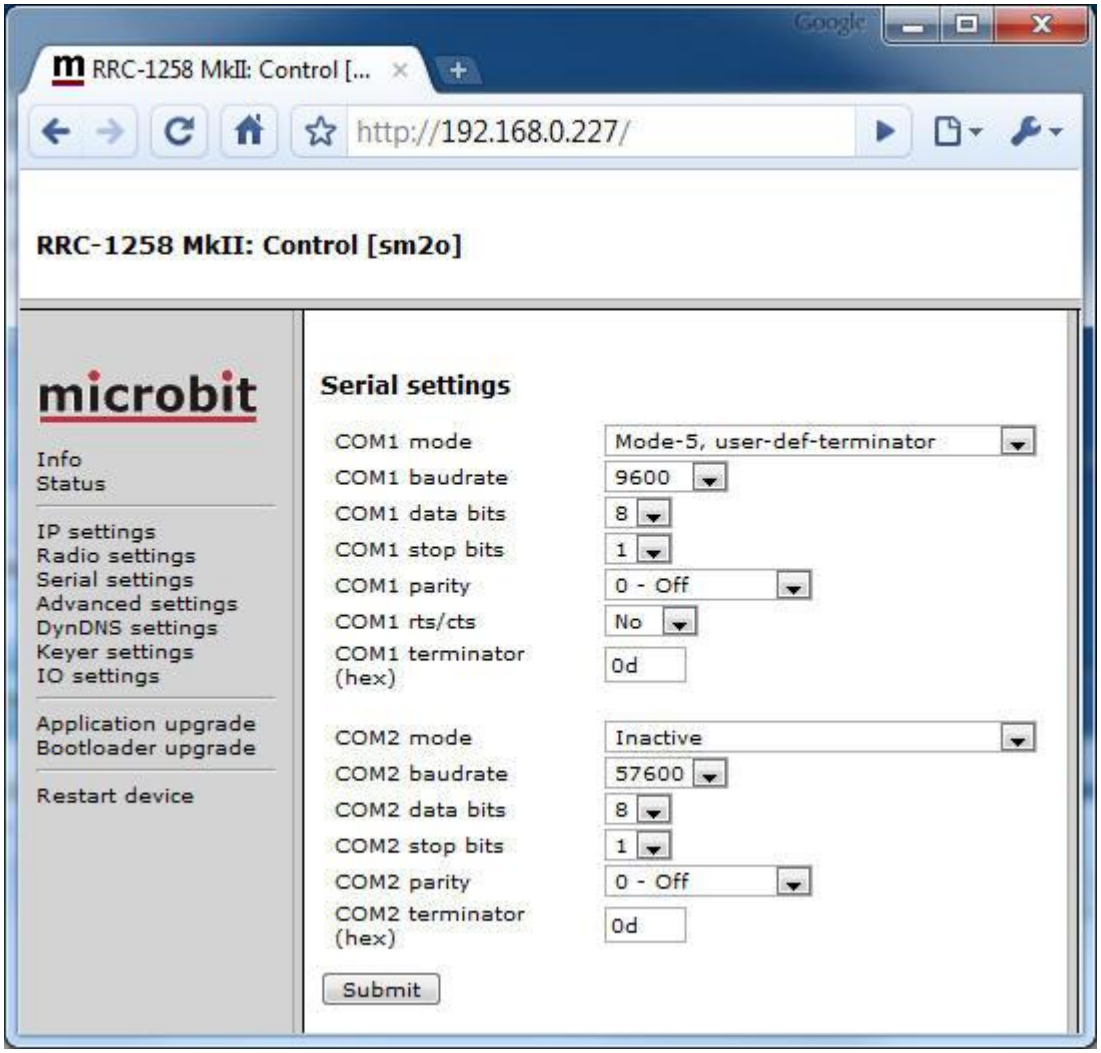

Parameter	Setting
COM1 mode	Select mode for COM1-to-COM1 transparent transfer of serial data between two opposite RRC. The setting defines the event that triggers the data transfer over Internet. - Inactive (default) - Char-by-char. A data packet is send for each char, needs lot of bandwidth. - ICOM CI-V. Used for CI-V control of IC-703/706 at the same time as you use the control panel. - Char-timeout. A data packet is sent when there is a pre-defined pause between two received char. - Kenwood, Yaesu, Elecraft. Used for CAT control of TS-480 or TS-2000 at the same time as you use the control panel. - User-def-terminator. Used if you want to define the terminator char by yourself (see below).

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COM1 baudrate	Set COM1 baudrate [bps]: 1200 2400 4800 9600 (default) 19200 38400 57600
COM1 databits	Set COM1 data bits: 5 6 7 8 (default)
COM1 stop bits	Set COM1 stop bits: 1 (default) 2
COM1 parity	Set COM1 parity: 0 = Off (default) 1 = Odd 2 = Even 3 = Forced-1 4 = Forced-0
COM1 cts/rts	Enable the transfer of CTS input to RTS output of other RRC. 0 = No (default) 1 = Yes
COM1 terminator	Defines the terminator character used in COM1-mode=5 (user-def-terminator). Character should be in HEX-format. 00 (default)
COM2 mode	Select mode for COM2-to-COM2 transparent transfer of serial data between two opposite RRC. The setting defines the event that triggers the data transfer over Internet. - Inactive (default) - Logical parallel with COM0. Is used for level converting for CI-V and FT-8x7. The settings from "Radio settings" are used. - Char-by-char. A data packet is send for each char, needs lot of bandwidth. - ICOM CI-V. Used for CI-V control of IC-703/706 at the same time as you use the control panel. - Char-timeout. A data packet is sent when there is a pre-defined pause between two received char. - Kenwood, Yaesu, Elecraft. Used for CAT control of TS-480 or TS-2000 at the same time as you use the control panel. - User-def-terminator. Used if you want to define the terminator char by yourself (see below).
COM2 databits	See COM1
COM2 stop bits	See COM1

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COM2 parity	See COM1
COM2 terminator	See COM1

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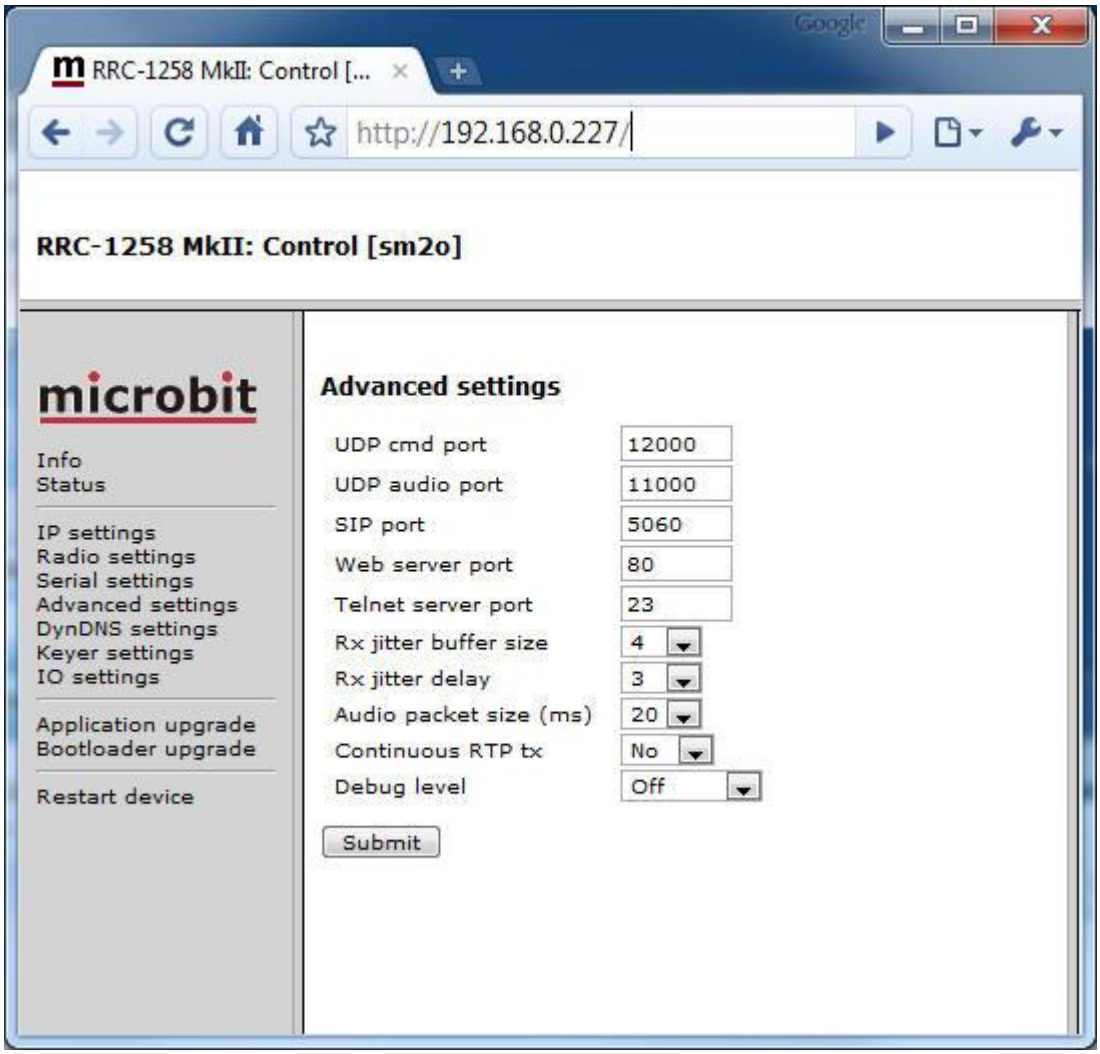
Advanced settings

Under advanced settings it is possible to change the default port numbers used by the RRC. It can be necessary if there are more than one RRC on your LAN or if you are using SIP based IP telephony (using port 5060). You really need to know what you are doing when you change port numbers especially on the Radio-RRC so that you don't disconnect yourself. Change web and telnet port number ONLY if you have to due to other services or more than one RRC on your LAN. If you lose the connection a car ride might be the next thing you do.



Parameter	Setting
UDP cmd port	Port number used for the Command channel. 12000 (default)
UDP audio port	Port number used for the audio channel 11000 (default)
SIP port	Port number used for the SIP session. 5060 (default)

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Web server port	Port number used for the internal http web server. 80 (default)
Telnet server port	Port number used for the internal telnet server. 23 (default)
Rx jitter buffer size	Set the maximum number of audio packets from the received audio stream that is buffered. Dictates maximum playback delay. Higher values result in better tolerance against bad Internet connections. Note that this value must be larger than the jitter delay. 4 (default)
Rx jitter delay	Set the number of audio packets received and buffered from the audio stream before beginning playback. Dictates minimum playback delay. Small values gives short delays, higher values result in better tolerance against bad Internet connections but the delay will increase. Note that this value must be less than the jitter buffer size. 3 (default)
Audio packet size (ms)	Sets the max size (length) of the audio packets in ms. If you have a good Internet connection with lots of bandwidth or running both RRC:s under the same LAN/WLAN it's possible to reduce the packet size down to 1 ms. Smaller packets means decreased delay but increased bandwidth. 20 (default)
Continuous RTP Tx	Control-RRC: If VOX will be used switch on this function. It means that the audio stream is sent continuously from the Control-RRC to the Radio-RRC. This can be a security problem for some user because the audio from the mic is sent to the Internet all the time. Radio-RRC: Some mobile (3G) networks have a delay before they open up for the audio stream which ends up in problems when releasing the PTT. This function often solves this problem. No (default) Yes
Debug level	Not used, and should not be changed. Off (default) Low Medium High

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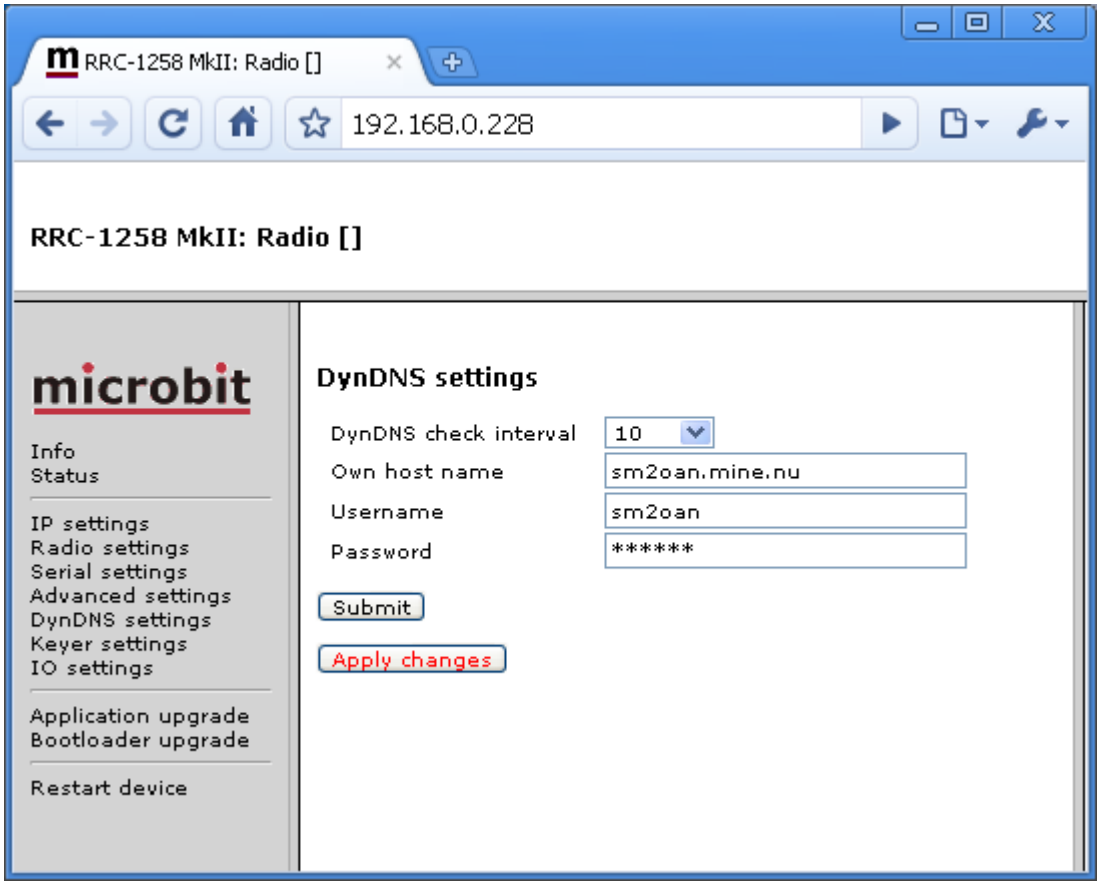
Dynamic DNS setting (only Radio-RRC)

The Radio-RRC has a DynDNS client to be used when the Internet Service Provider (ISP) uses dynamic IP addresses instead of fixed IP address. The DynDNS client checks what IP address your router has got from the ISP and sends the information to DynDNS:s DNS server. When using DynDNS you enter "Own host name" instead of an IP address in the SIP contact setting in the Control-RRC and you don't need to bother if the IP address at the Radio-RRC changes. You need to register an account (free of charge) at http://www.dyndns.com/services/dns/dyndns/ and get a domain name. There are other providers of the same service but RRC-1258MkII only supports DynDNS.



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Parameter	Setting
DynDNS check interval	Sets how often the external IP address of your router should be checked, value in minutes: Off (DynDNS client disabled) 10 20 30 40 50 60 180 600 1440
Own host name	Domain name registered at DynDNS.com. Example: my-radio-site.ham-radio-op.net
Username	DynDNS account username.
Password	DynDNS account password.

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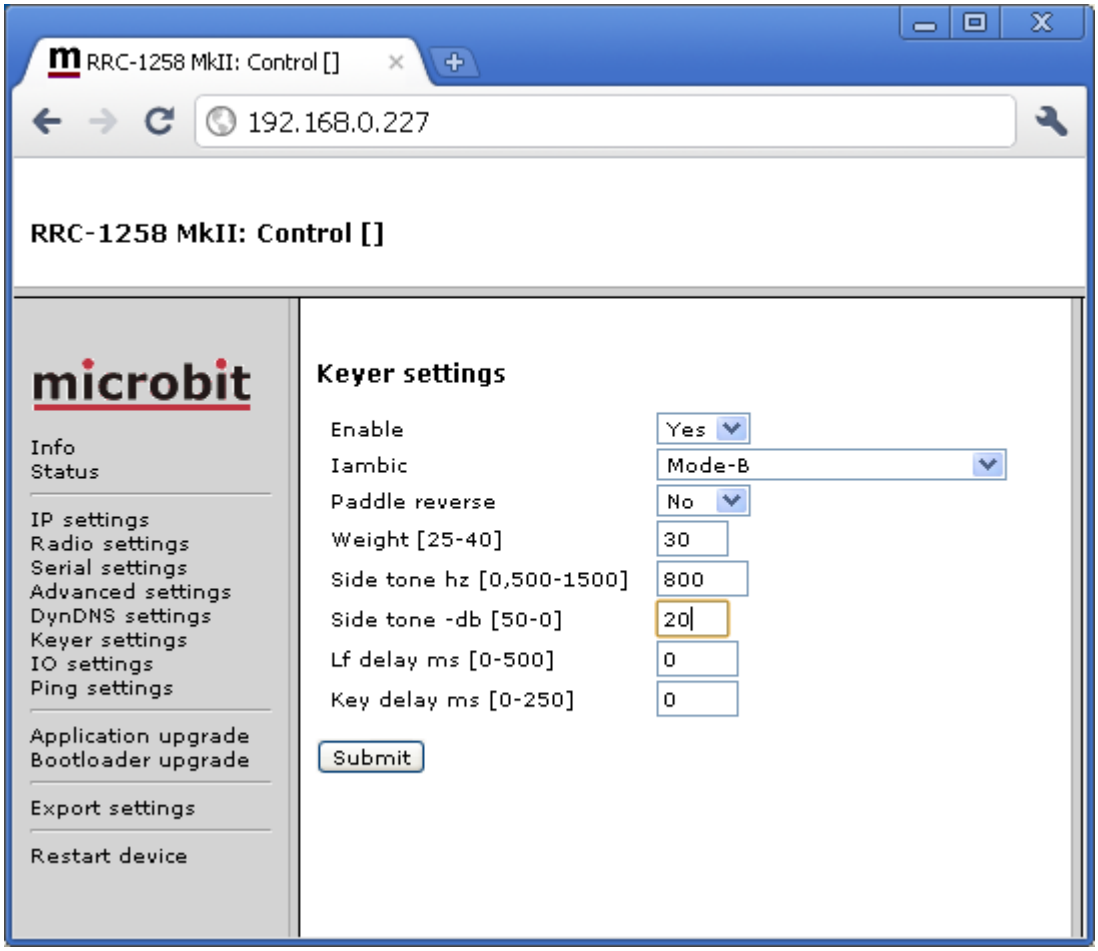
Keyer Settings (only Control-RRC)

A very powerful function for remote CW operation is implemented in the RRC-1258MkII. The system is able to handle delays and jitter caused by Internet in a unique way. This function is also dependant on the I/O configuration, see IO settings.



Parameter	Setting
Enable	Enable the CW-keyer function. No = CW-keyer is off (default) Yes = CW-keyer is on
Iambic	Set the CW-keyer iambic mode. Old type, squeeze keyer Mode-A Mode-B (default) Mode-B + auto-char-space
Paddle reverse	Set the reverse mode for the CW-paddle. No, left paddle dot & right paddle dash (default) Yes, left paddle dash & right paddle dot

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Weight	Time ratio between dash and dot. 25-40 = 2.5-4.0/1 30 = 3.0/1 (default)
Side tone hz	Frequency for the side-tone in Hz. 0,500-1500 = side-tone frequency in Hz 800 = 800 Hz (default) 0 = No local side tone is generated, can be used to test how the CW sounds if you enable side tone in the radio and send with memory keyer or PC.
Side tone -dB	Audio level for the side-tone in dB. 50-0 = audio level in –dB 20 = -20 dBm (default)
Lf delay ms	Mute (delay) time for audio from the radio at Control-RRC after a dot/dash command. Recommendation - start with same value as the ping time. 0-500 = delay in milliseconds 0 = no delay (default)
Key delay ms	Delay time before the keying of the radio is executed at RRC-radio. 0-250 = delay in milliseconds 0 = no delay (default)

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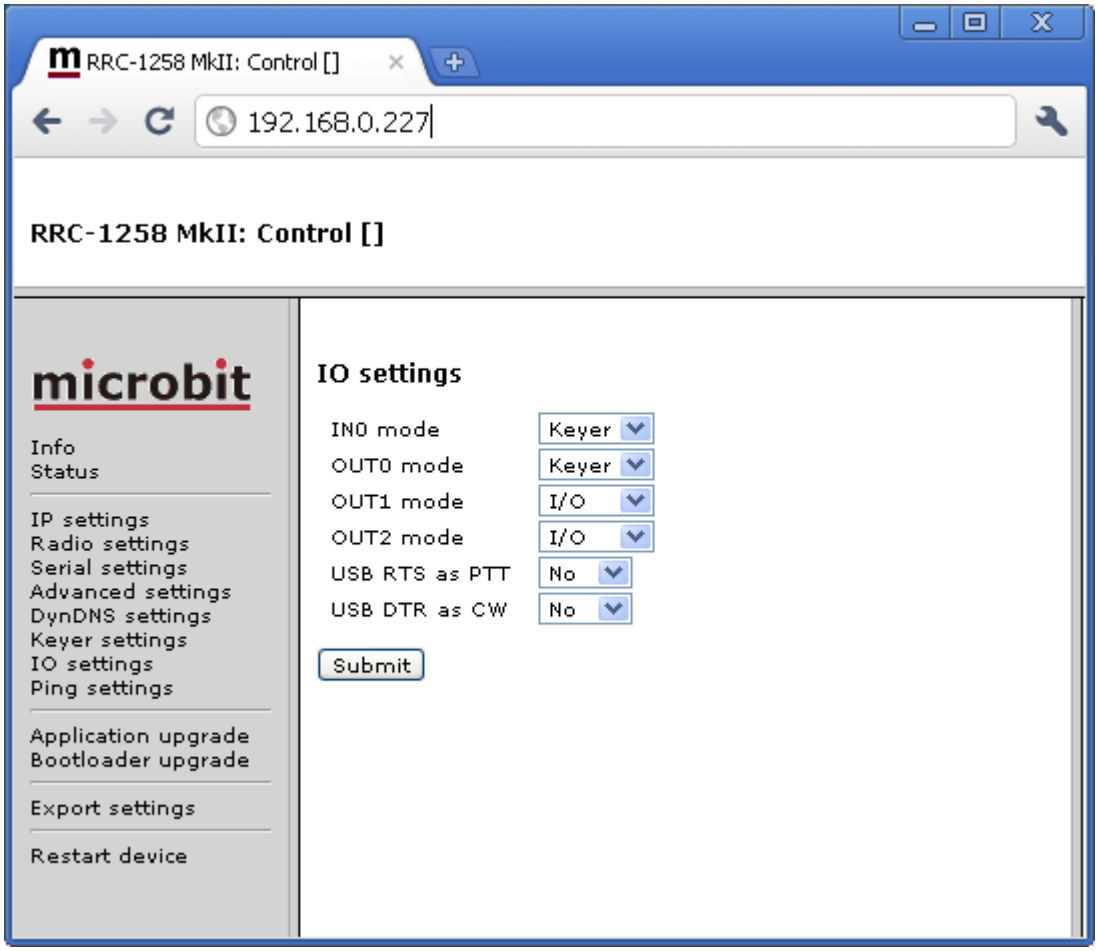
IO Settings

The inputs and outputs in both the Control-RRC and Radio-RRC are configurable to meet different needs.

Control-RRC:



Parameter	Setting
IN0 mode	Select the function for Input-0 (IN0) signal in the I/O connector. 0 = I/O, input status is transferred to Radio-RRC (default) 1 = Keyer, straight key or external keyer 2 = PTT, PTT-switch or foot-switch etc.
OUT0 mode	Output 0 can be configured for one of two functions. I/O = Indicating that SIP connection is up. Keyer = The output act as a local output to for the keyer to key a local radio. (default is I/O)
OUT1 mode	OUT1 mode Output 1 can be configured for one of two functions.

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	I/O = The output follows Input 1 from the Radio-RRC. Keyer = The output act as a local output to for the keyer to key a local radio. (default is I/O)
OUT2 mode	Output 2 can be configured for one of two functions. I/O = The output follows Input 2 from the Radio-RRC. Keyer = The output act as a local output to for the keyer to key a local radio. (default is I/O)
USB RTS as PTT	Select if the USB virtual COM port RTS signal is used as external PTT. 0 = No (default) 1 = Yes
USB DTR as CW	Select if the USB virtual COM port DTR signal is used as straight key output. 0 = No (default) 1 = Yes

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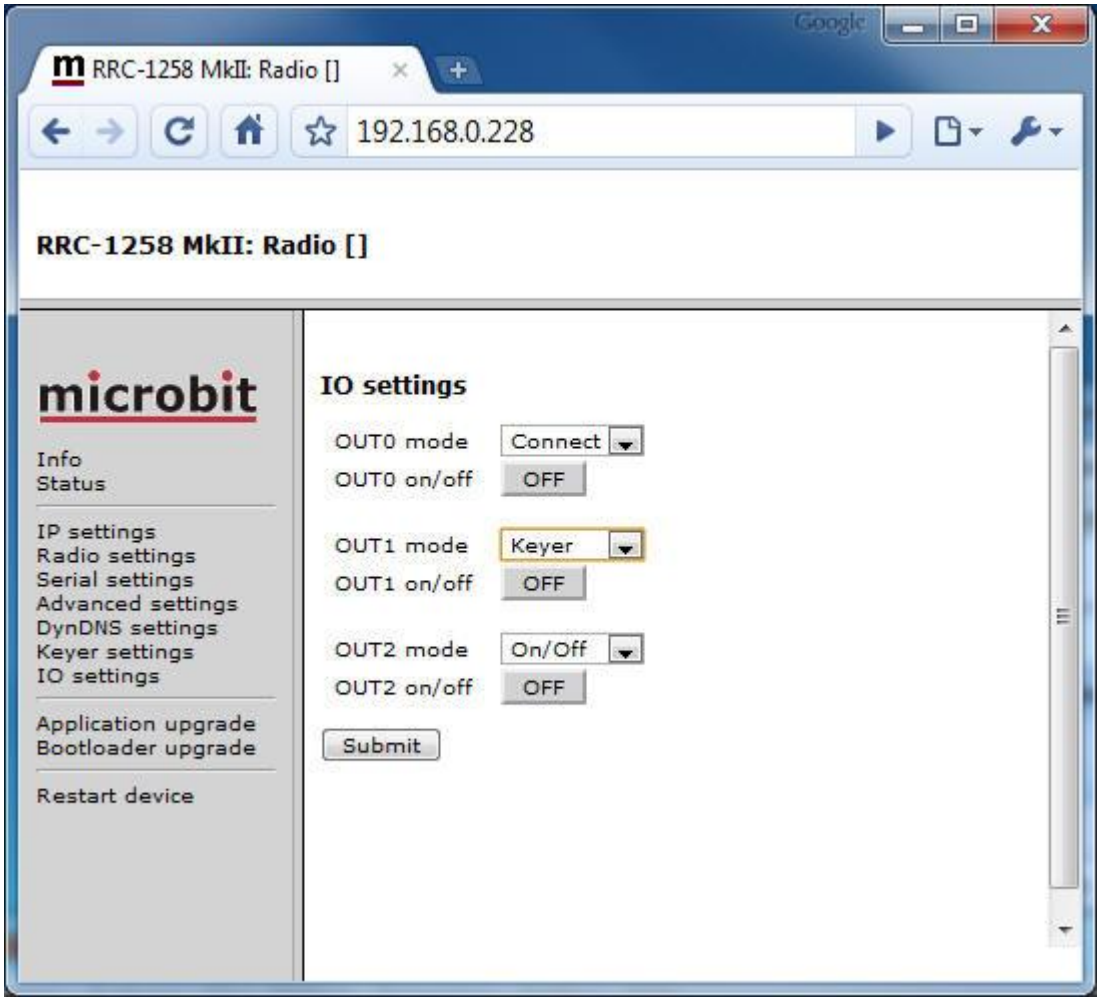
Radio-RRC:



Parameter	Setting
OUT0 mode	Select the function for output-0 (OUT0) signal the I/O connector. 0 = I/O, active when IN0 on Control-RRC is active (Control-RRC IN0-mode setting must be in state I/O). (default) 1 = Keyer, output to the radio straight key input 2 = PTT, used as external PTT 3 = Connect, active when the SIP-connection is active 4 = On/Off, controlled by the ON/OFF button on this side (*) 5 = Keyer PTT, active when CW is send via the keyer (can be used to key a PA). If you set "key delay" in the Control-RRC this output will be activate "key delay" ms before the actual CW-keying is started.

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OUT1 mode	Select the function for output-1 (OUT1) signal the I/O connector (or tip in the PAD-jack). 0 = I/O, active when IN0 on Control-RRC is active. (Control-RRC CW-Keyer function must be disabled). (default) 1 = Keyer, output to the radio straight key input 2 = PTT, used as external PTT 3 = Connect, active when the SIP-connection is active 4 = On/Off, controlled by the ON/OFF button on this side (*) 5 = Keyer PTT, active when CW is send via the keyer (can be used to key a PA). If you set "key delay" in the Control-RRC this output will be activate "key delay" ms before the actual CW-keying is started.
OUT2 mode	Select the function for output-2 (OUT2) signal the I/O connector (or ring in the PAD-jack). 0 = I/O, active when IN0 on Control-RRC is active. (Control-RRC CW-Keyer function must be disabled). (default) 1 = Keyer, output to the radio straight key input 2 = PTT, used as external PTT 3 = Connect, active when the SIP-connection is active 4 = On/Off, controlled by the ON/OFF button on this side (*) 5 = Keyer PTT, active when CW is send via the keyer (can be used to key a PA). If you set "key delay" in the Control-RRC this output will be activate "key delay" ms before the actual CW-keying is started.

(*) When the ON/OFF buttons are pushed the output change will be immediate, but will resume to last saved position after power on. To make the changes permanent use the "apply changes" button.

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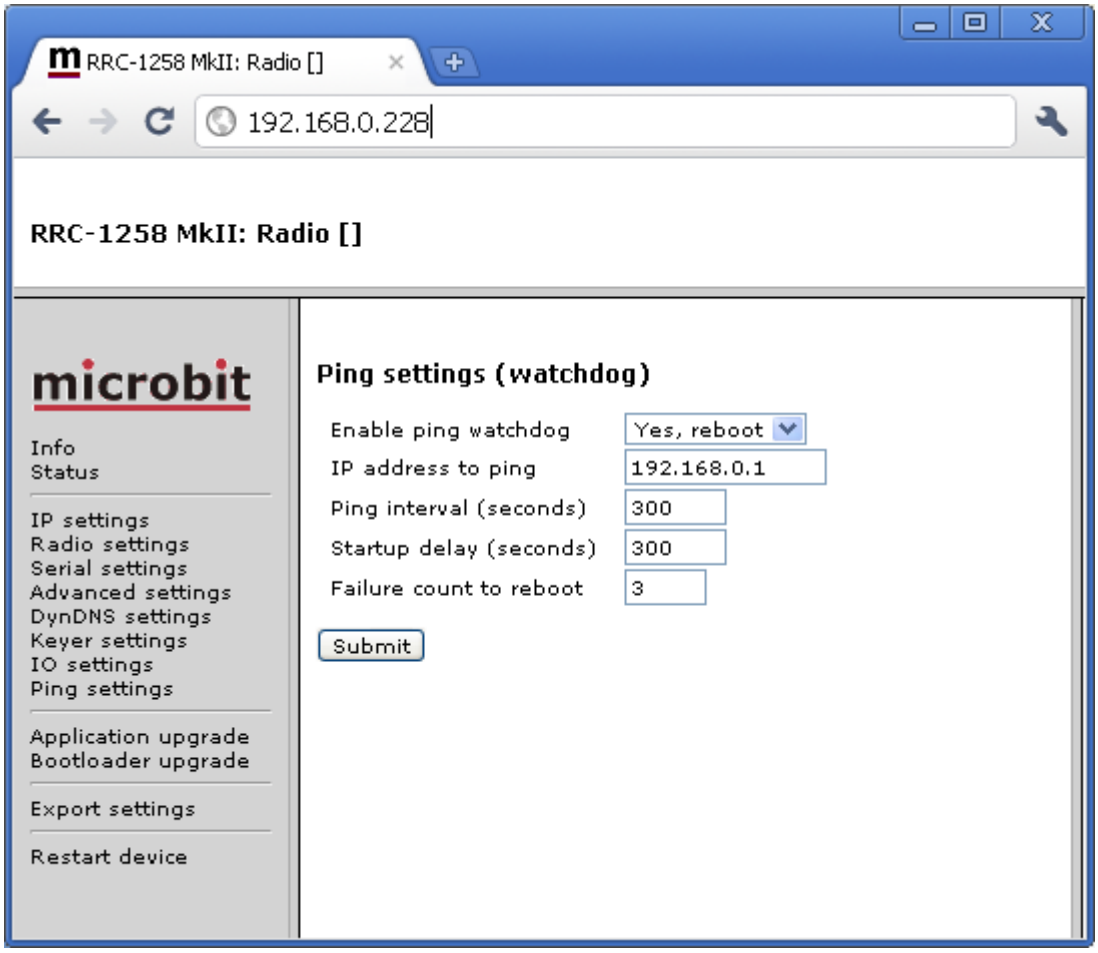
Ping settings (only Radio-RRC)

The Radio-RRC has a Ping Watchdog function which can be used as an extra security. This function is quite common in network equipments. It can be set to ping an IP address and when it does not get any answer, it will make a hard reboot of the RRC. The status of the ping watchdog can be checked at the status page. This function is only available on the Radio-RRC.



Enable ping watchdog	Enables the function. No = Function is disabled Yes, test = Function enabled but it will not actually reboot, can be used for test Yes, reboot = Function is enabled.
IP address to ping	IP address to ping is entered here, In normal cases use the Gateway IP.
Ping Interval (seconds)	Interval between the ping is sent. (1-65535, default 300 s)
Startup delay (seconds)	Delay before the first ping is sent. (300-65535), default 300 s. If Test mode is activated it can be set to 10-65535
Failure count to reboot	Sets how many times the ping is allowed to fail before reboot is done. (1-255, default 3)

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Export settings (HTML)

This function creates a text file with the actual settings and status of the unit. This file can be sent via email for support purposes for example.

Export settings (bin)

This function is used to backup your settings to a file in your PC. When clicking on the link a dialog box will show up where you can decide where to store and the name of your backup file.

Note! The exported file will only include settings for the active profile.

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Import settings (bin)

This function is used import your backup file from your PC. Click on select file and browse to your file and then click import.

Note that the imported settings will be stored in the currently selected profile.

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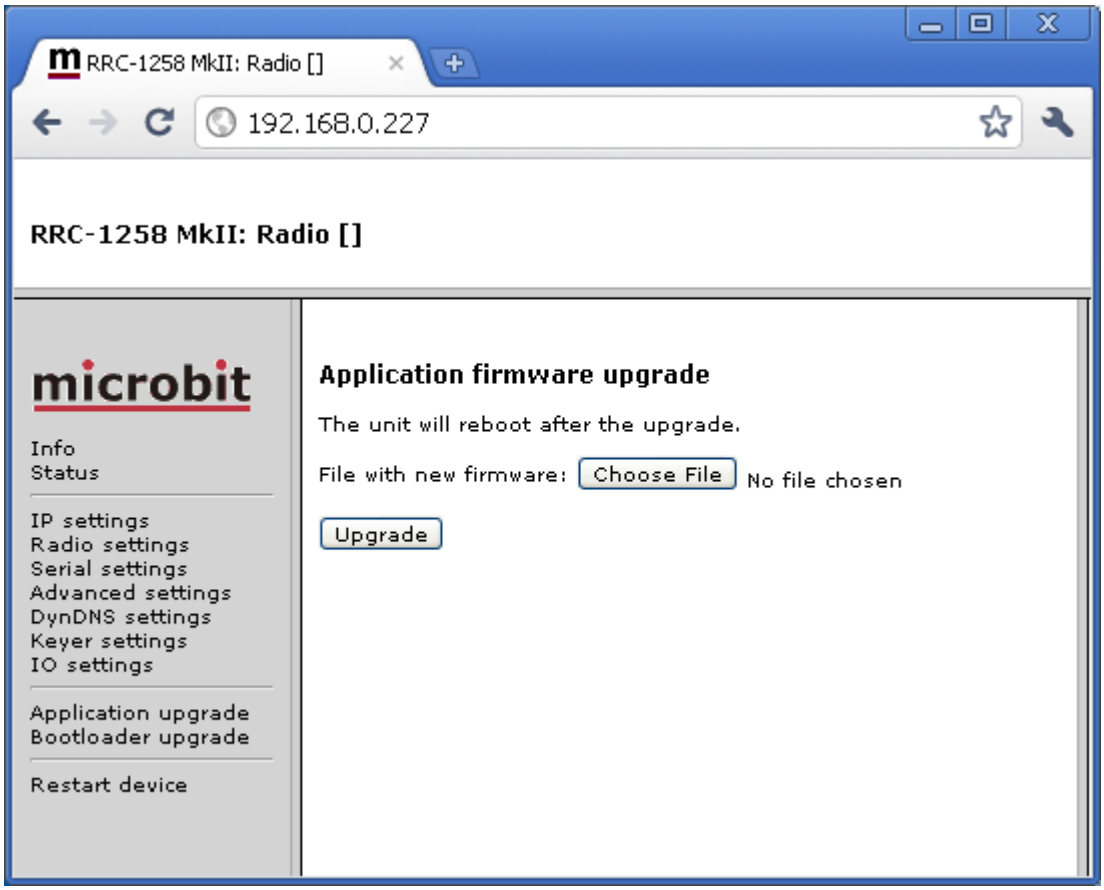
Application firmware upgrade

The application firmware can be updated over the Internet via the web interface when bugs are fixed and/or new functionality is implemented. You don't have to be where the RRC-1258MkII is to do the updates. Download the new firmware from www.remoterig.com and save the file on your computer (it has a name like RRC1258-CRC_v1.38_2009-09-04.bin).

Connect to the RRC you want to update and select 'Application-upgrade'. Then click on the 'Browse' button and select the file with the new firmware. After that you click on the 'Upgrade' button and the new firmware will be transferred and saved into the RRC. When the firmware is updated the RRC will restart. Note -- Do not interrupt the upgrade process in any way.



Wait a minute or two then connect to the RRC again and select 'Info' and verify that the Software version is updated. If it looks like its not updated empty the web browser cache, to prevent it from showing an old cached page. The update NEVER fails but the browser is a common problem.

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Bootloader firmware upgrade

This follows the same steps as the application firmware upgrade procedure above.

Restart device

Restart device can be used if you want to reset and restart the RRC without saving any changes (before apply changes) or just for ordinary reset.

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Configuration with terminal-interface

All parameters can also be programmed via the serial interface COM1 (RS-232) or Telnet port. COM1 has the following settings: 38400 baud, 8 bits, No parity, and 1 stop bit. Select the sys [s] and setup-edit [1] menus to configure the RRC. This method of configuration is not user friendly and should be avoided.

```
=========================
a: audio
c: codec
d: debug
e: extio
f: flash
i: sip
l: led
q: audio quality
p: power
r: radio
s: sys
u: usb
=========================
s

sys
=========================
1: setup edit
2: setup view
3: setup clear
4: sntp
5: rtc
6: wdt reset
7: dns query
8: show network info
9: STUN test
0: memory
a: UDP send
b: UDP receive
c: Setup default 1(Control)
d: Setup default 2(Radio)
r: COM1-rts/cts on/off
q: exit
```


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CW-Keyer

General

The RRC-1258 has a CW-keyer function that makes CW operation possible over Internet even if there are long latencies and lots of jitter. Note that the CW-keyer is by default disabled.

The CW-keyer side-tone is generated locally at the control RRC. When the dot or dash is executed the audio from the radio can be muted at the Control-RRC to disable the radio side-tone or annoying clicks and sounds. The time the mute function is active is defined by the lf-delay setting. The value of lf-delay depends on the latency of Internet. A good start value is the same value as the ping time between control and radio QTH.

Another unique feature is a kind of adjustable jitter buffer at the radio end. If the Internet connection has varying latencies, you can set a key-delay before the keying of the radio is executed. This delay makes it possible to reconstruct the transmission on-the-fly and the system will be much more tolerant against varying latencies (jitter). Longer key-delays give higher tolerance against jitter but also add delay until the keying is executed at the radio. Even if you have a good connection you could try with a low value. Remember that when you increase this value you must also increase the lf-delay value.

Settings

Keyer settings:	**Control**	**Radio**
Enable	Yes	
Iambic	Mode-A	
Paddle reverse	No	
Weight [25-40]	30	
Side tone hz [500-1500]	800	
Side tone –dB [50-0]	20	
Lf delay [0-500]	0	
Key delay [0-250]	0	

IO settings:	**Control**	**Radio**
IN0 mode	I/O	
USB DTR as CW	No	
OUT0 mode		I/O
OUT1 mode		I/O
OUT2 mode		Keyer

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Connections

PAD – Control-RRC:

At the Control-RRC the PAD-jack is used to connect a CW-paddle. The input is for a standard 3.5 mm stereo plug. The left paddle is connected to the tip and the right paddle to the ring. Common is connected to the inner ring and house. Note - these signals are also available in the I/O-connector.

Signal	PAD jack	IO setting
left-paddle	tip	-
right-paddle	ring	-
gnd	inner ring	-

PAD – Radio-RRC:

At the Radio-RRC the PAD-jack is used to connect the output signal from the CW-keyer to the radio straight-KEY input. The output is for a standard 3.5 mm stereo plug. A standard cable with 3.5 mm connector in both ends can often be used. Note - these signals are also available in the I/O-connector.

Signal	PAD jack	IO setting
keyer-output	tip	OUT2 mode = Keyer
keyer-output	ring	OUT1 mode = Keyer
gnd	inner ring	-

USB – Control-RRC:

A PC with straight-key functionality can be used to perform the keying, alone or in combination with a CW-paddle. To activate keying the PC could use the DTR signal in the virtual USB COM-port delivered by the RRC USB device. The PC control works in parallel with the CW-paddle so it is possible to shift between PC-keying and the CW-paddle without changing the configuration.

I/O-connector – Control-RRC:

A PC with straight-key functionality or other external keyer can be used to perform keying, alone or in combination with a CW-paddle. To activate keying connect pin-4 (IN0) to GND. The external keyer works in parallel with the CW-paddle so it is possible to shift between external keying and the CW-paddle without changing the configuration.

Note - The straight-key input (IN0) is a generic input and cannot be connected direct to a PC, you need an interface, see appendix.

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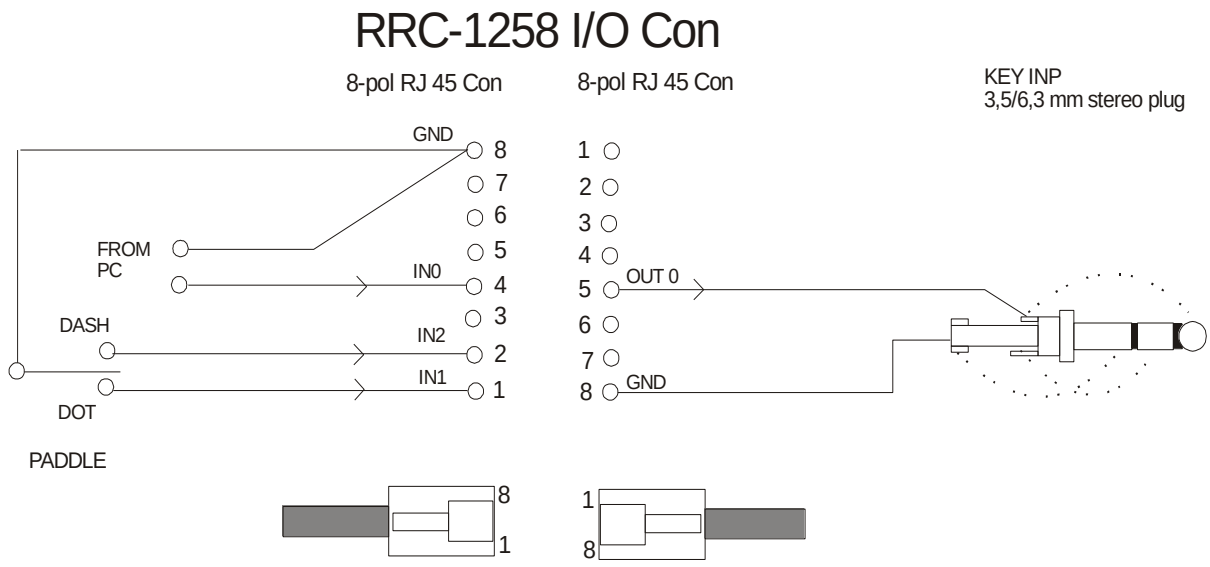
Signal	I/O connector	IO setting
right-paddle	1 (IN1)	-
left-paddle	2 (IN2)	-
straight-key/PC	4 (IN0)	IN0 mode = Keyer
gnd	8	-

I/O-connector – Radio-RRC:

The output signal from the CW-keyer to the radio straight-KEY input can also be found in the I/O connector.

Signal	I/O connector	IO setting
keyer-output	3 (OUT1)	OUT1 mode = Keyer
keyer-output	5 (OUT0)	OUT0 mode = Keyer
keyer-output	6 (OUT2)	OUT2 mode = Keyer
gnd	8	-



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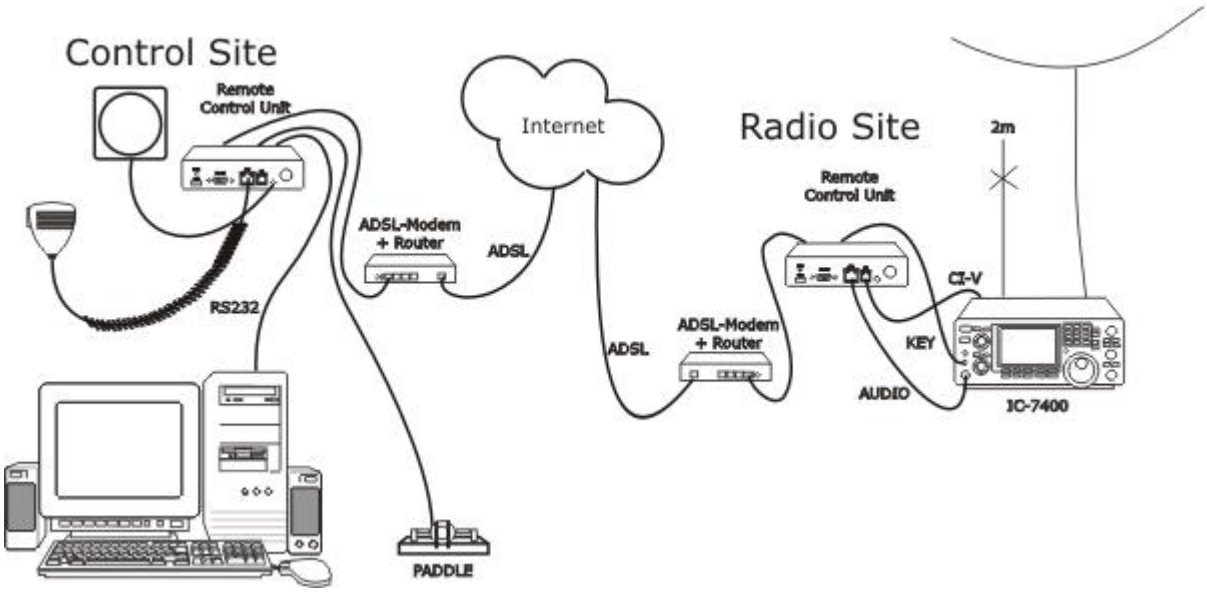
ICOM CI-V

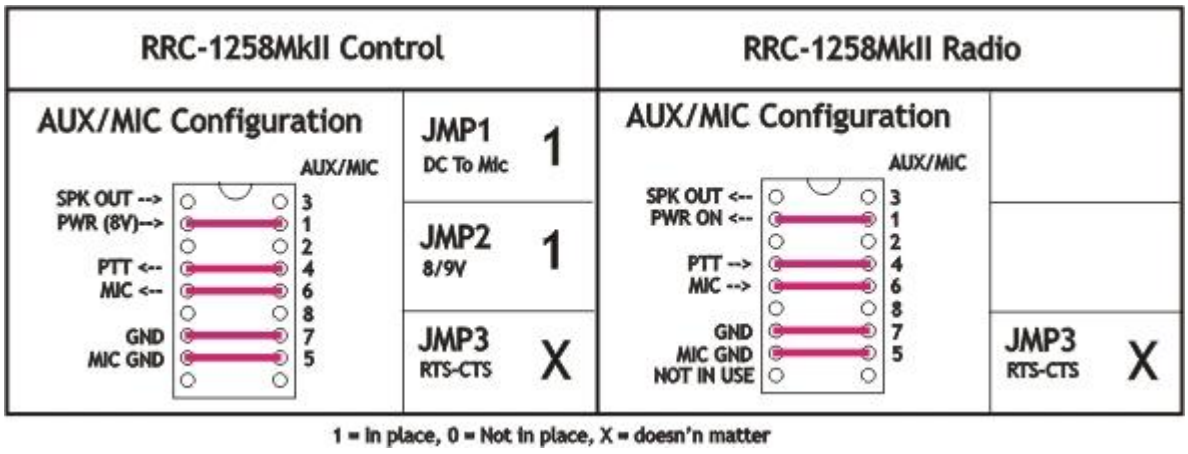
General



RRC-1258MkII supports the CI-V protocol used by almost every ICOM radio. Then you have to use a PC-software e.g. HamRadioDeLuxe or similar rig control software at the control site. All audio and data communication goes true the RRC:s and you don't need a PC at the remote site. The Connect/Disconnect button on the web status page is used to connect/disconnect to/from the remote site. It can also be done by the UP-button on the microphone or be set to always be connected.

Hardware configuration

<u>Normal:</u>



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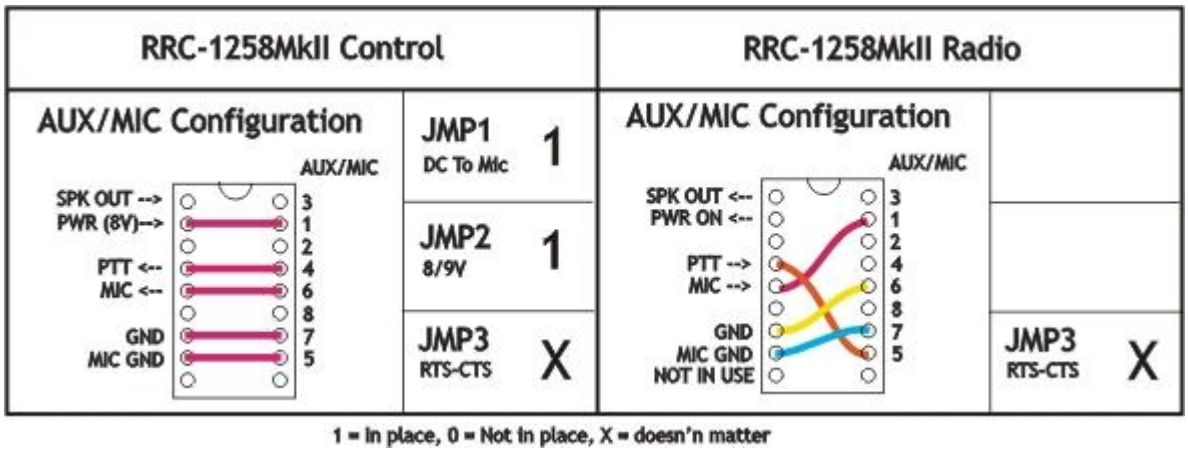
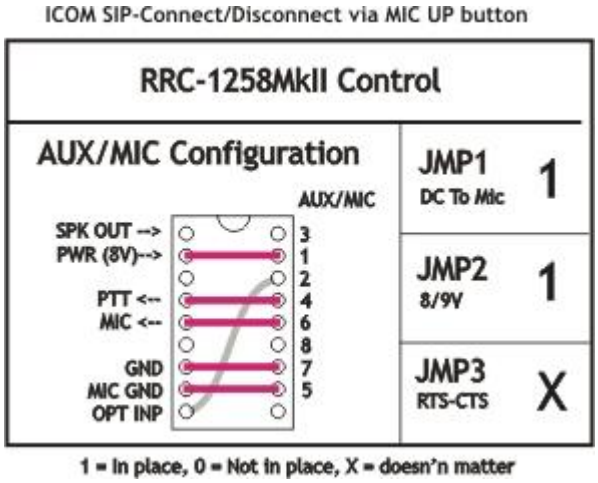
With SLCAB8R adapter cable:



SIP-Connect/disconnect via MIC UP button:



Radio settings (example)

Parameter	Control	Radio
Program mode	1 – ICOM CI-V	1 – ICOM CI-V
SIP password	hello	hello
SIP realm		
SIP contact	192.168.0.228	
Auto connect	No	
Audio quality	2 – Linear 16 bits 8 kHz	2 – Linear 16 bits 8 kHz
Audio dual-rx (*)		No
Codec out gain	255	255
Codec inp gain	18	0

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Codec inp preamp	Yes	
Codec inp HPF Hz	163	163
COM0 baudrate	9600	9600
COM0 data bits	8	8
COM0 stop bits	1	1
COM0 parity	0 - Off	0 - Off

(*) Available only in RRC-1258MkIIs, remember that the bandwidth demand is doubled.

Connections

Drawings of the connection cables can be found under appendix B.

Control-RRC:

- Connect a standard RS-232 cable between the PC and the RRC COM2.
- The microphone can be connected direct to the RRC AUX/MIC connector if you have a microphone with RJ-45 connector, like the HM-103. If you have a microphone with a circular connector like HM-36 you can buy an adapter cable, OPC-589, from ICOM or make one by yourself.
- The speaker is connected direct to the RRC SP-jack with a 3.5 mm stereo plug.

Radio-RRC:

- From the RRC TTL connector to the radios CI-V jack you need to make a simple cable. The cable should have a 4/6 modular connector in one end and a 3.5 mm stereo plug in the other end. The 3.5 mm plug is connected to the radio CI-V jack.
- Between the RRC AUX/MIC connector and the radios microphone jack you can connect a standard patch cable if the radio have a RJ-45 jack. If the radio have a circular microphone jack you need to make an adapter cable by yourself or buy one from e.g. a Tigertronics distributor (for Signallink), its article number is SLCAB8R. If you use Tigertronic cable you need to put the straps different. If you make the cable by yourself, just cut a standard FTP (screened) patch cable and solder an 8-pin circular connector on it. Make the cable as short as possible to prevent it from picking up HF.
- The speaker signal from the radios external speaker jack to the RRC SP jack is connected via a standard "off- the-shelf" cable with 3.5 mm stereo plugs in both ends.

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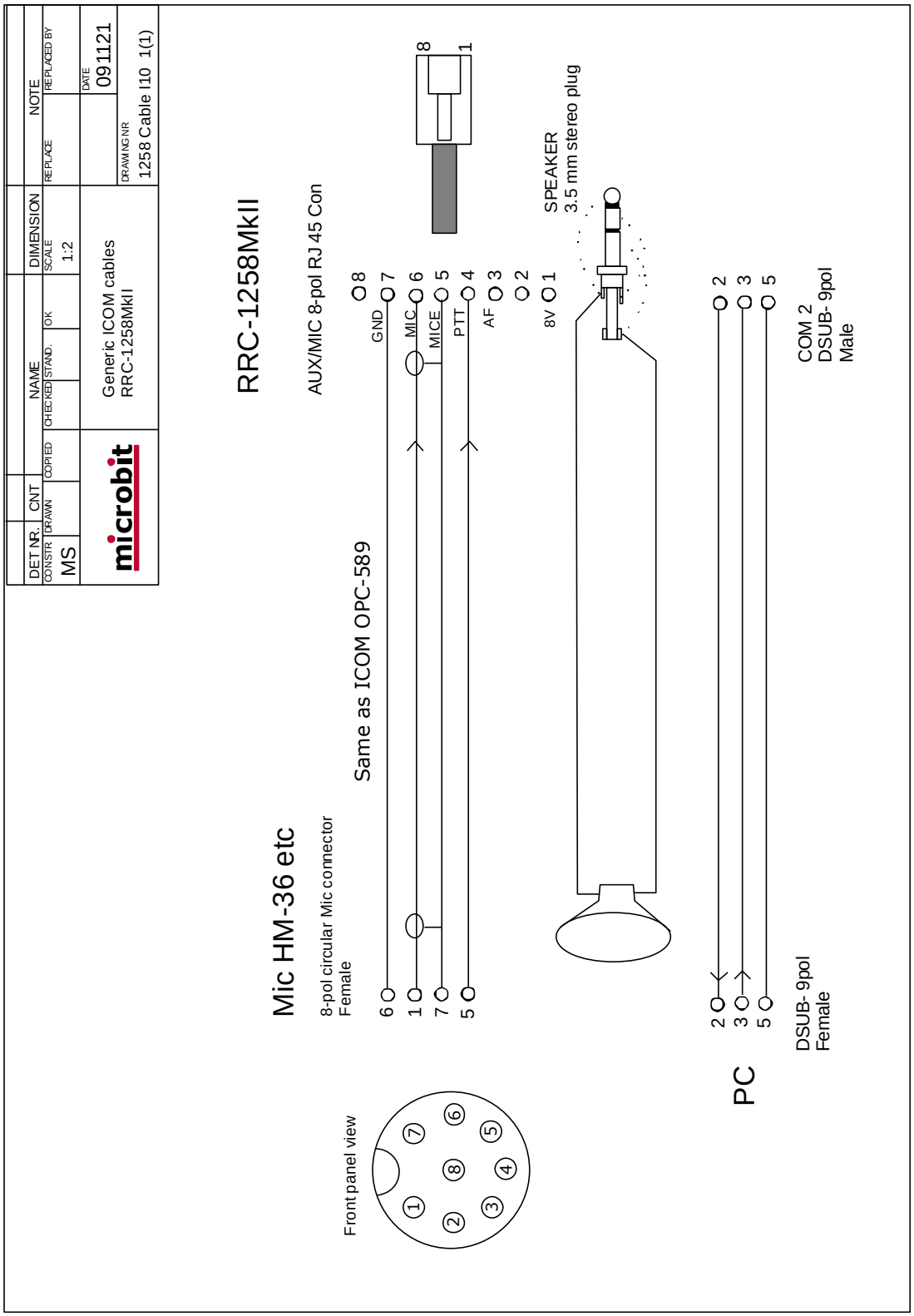

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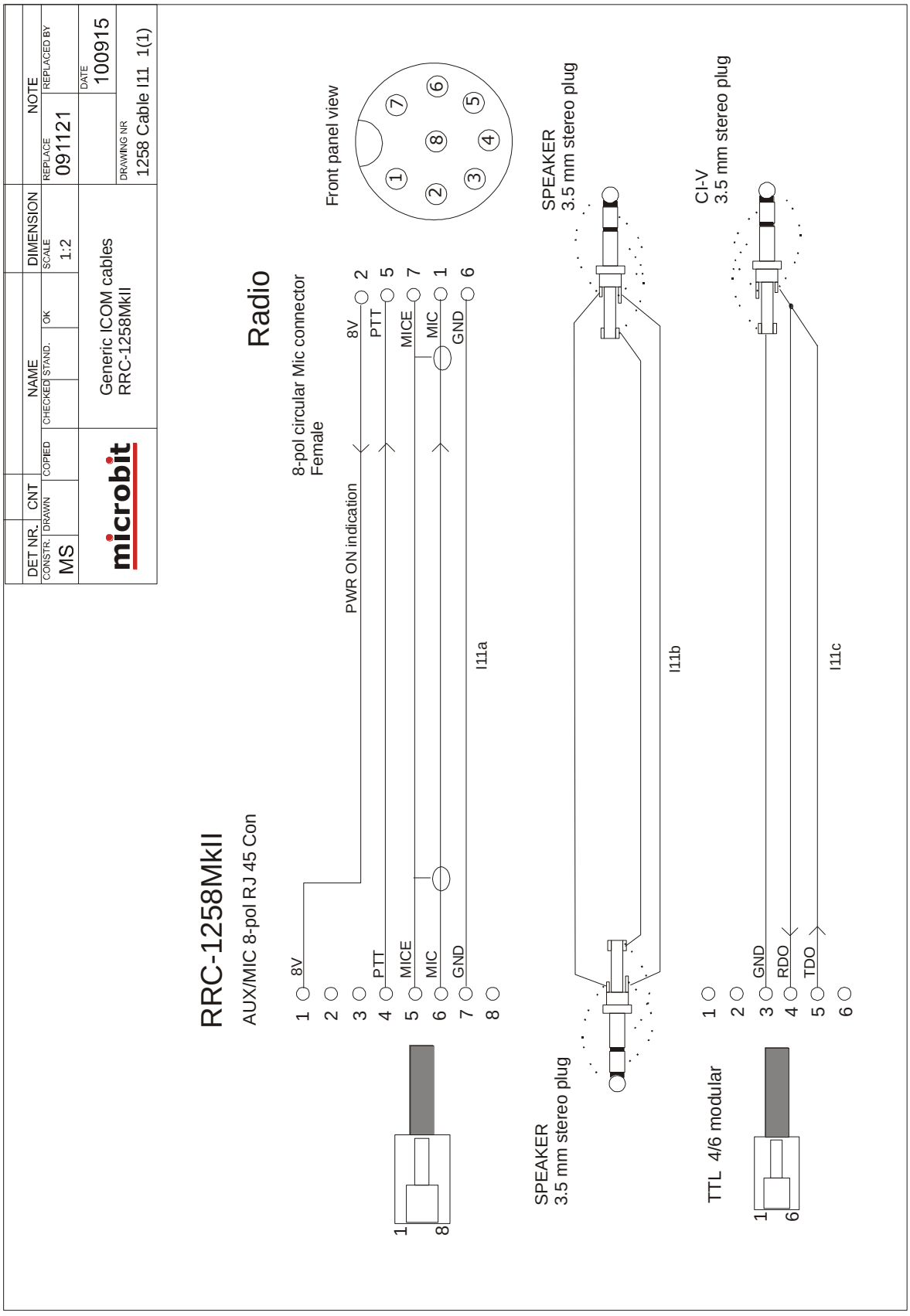

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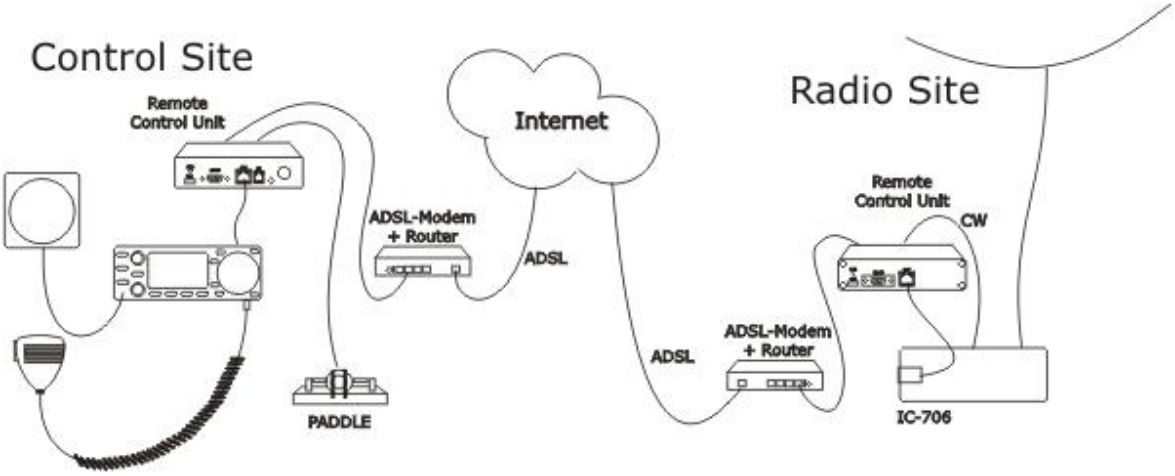
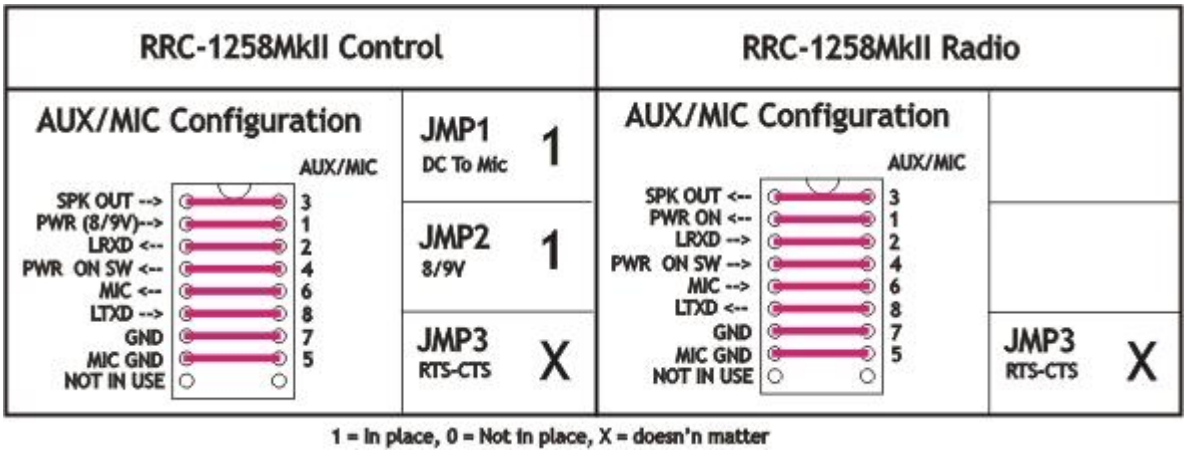
ICOM IC-703, IC-706

General



The idea of remote controlling IC-703/706 is simple; it's just to extend the cord between the radio and the control panel using Internet. When you press the power button on the panel the radio comes to life at the remote side and sound and panel info flows across the Internet between the pair of RRC-1258MkII:s. The look and feel of the panel is the same as if the panel was directly connected to the radio.

Hardware configuration



1 = In place, 0 = Not in place, X = doesn't matter

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Radio settings (example)

Parameter	Control	Radio
Program mode	2 – IC706	2 – IC706
SIP password	hello	hello
SIP realm		
SIP contact	192.168.0.228	
Auto connect	No	
Audio quality	2 – Linear 16 bits 8 kHz	2 – Linear 16 bits 8 kHz
Audio dual-rx (*)		No
Codec out gain	255	255
Codec inp gain	18	0
Codec inp preamp	Yes	
Codec inp HPF Hz	163	163
COM0 baudrate	19200	19200
COM0 data bits	8	8
COM0 stop bits	1	1
COM0 parity	0 - Off	0 - Off

(*) Available only in RRC-1258MkIIs.

Connections

All necessary signals between the panel and the radio are connected with the 8 wires in the cable OPC-581 or OPC-587 from ICOM. We just need to cut it apart and connect a RRC-1258MkII in each end. The following signals are represented in the cable, (the numbering is for the RJ45 connector to the RRC after converting the cable, not for the ICOM connector):

1 8V power to control panel (only when radio is ON)
2 LRXD - serial data 19200 bps from panel to radio
3 AF - audio to speaker.
4 PWK - power control, grounding it switch on the radio
5 MICE - mic ground
6 MIC- mic Signal
7 GND
8 LTXD - serial data 19200 bps from radio to panel

Cut the ICOM cable (OPC-581 or OPC-587) and connect both ends to a standard CAT-5 patch cable for computer networks, use shrinking tubes to protect the soldering. One problem is that the ICOM cable is very soft and there is more sewing tread than copper wire. The copper wire is also varnished to make it even more difficult. Before you connect the cables to the RRC:s, please check the cables by connecting them together with a 2xRJ45 connector. Also pay attention to that a speaker or headset must be connected to the speaker jack on the IC-706 front-panel otherwise the no audio will be sent from the microphone to the radio.

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Power supply

Control-RRC:

The Control-RRC is supplied with a common 13,8 V (10-18V) power supply. The display and speaker amplifier needs a lot of power so you need 1A.

Radio-RRC:

The Radio-RRC should be supplied from the same power supply as the radio to avoid humming. Please put a small fuse on the cable if you connect it to a 30 Amp PS.

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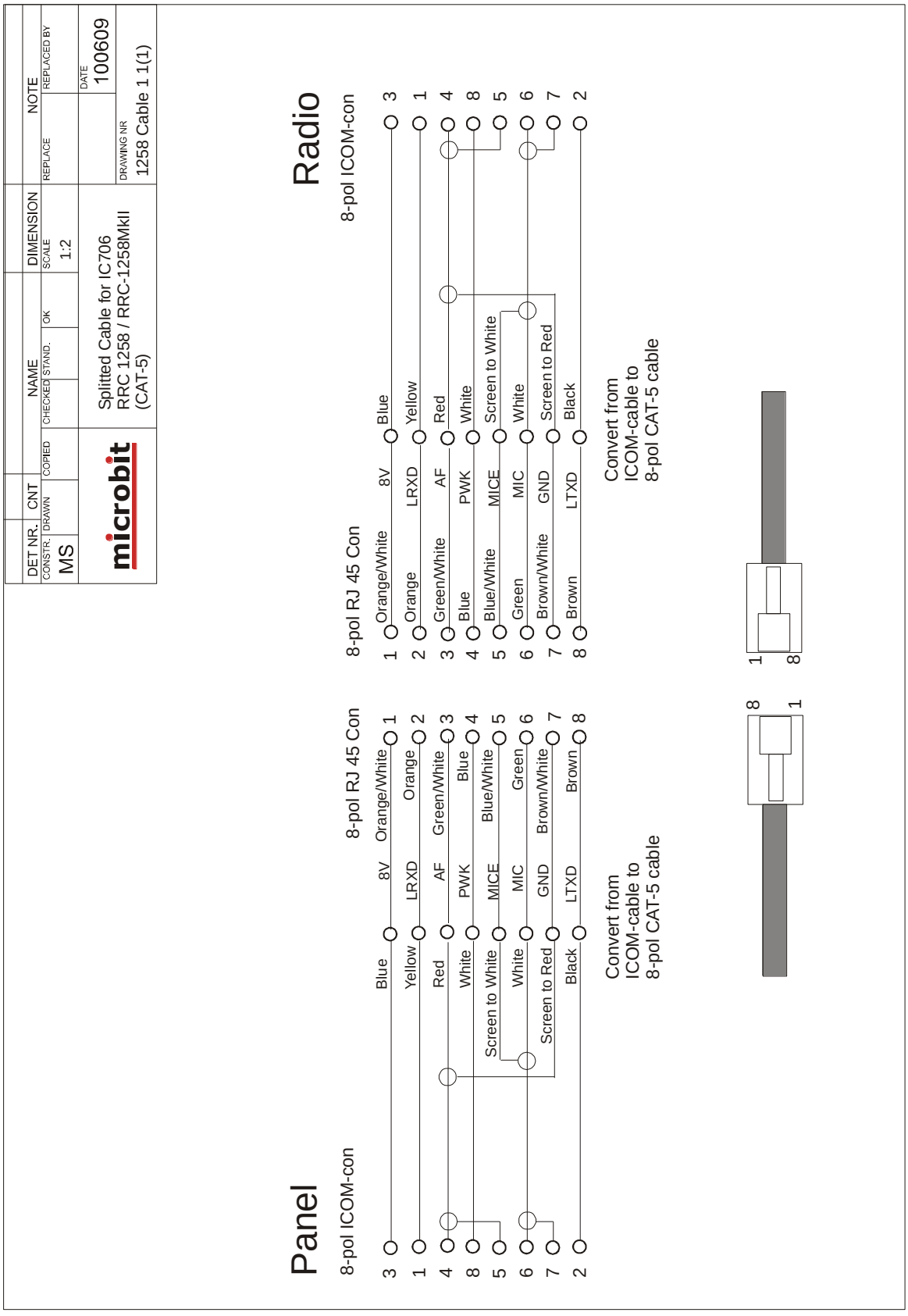

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Prepare the separation cable to IC-703 and IC-706

The cable between front and radio before it is cut apart. You have to buy this cable from your local ICOM-dealer (art no OPC-581 or OPC-587).

Connector at radio end.

Connector at control panel end.

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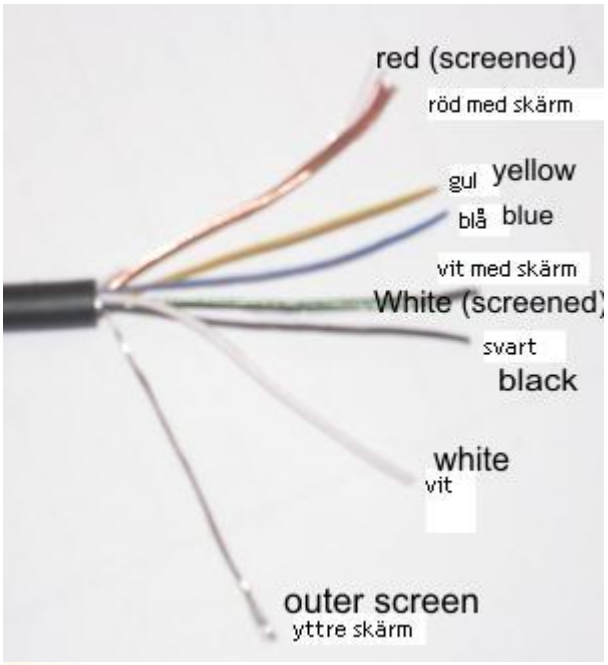

- Identify the end with the connector to the radio, se above.
- Cut the cable apart, don't make it longer then needed at radio end. The mic signal is sensitive of HF from antennas etc. as usually.
- Take away about 40 mm of the outer covering.
- Separate the shields from the inner wire, the red wire has a copper coloured shield and the white has a green shield. The shielded white wire is thinner than the white one without a shielding. That way you can identify them from each other. The outer shielding is not connected to the RRC.
- Cut all wire to about 20 mm. Take way about 3 mm of the cover from each wire and tin-plate them. It's not easy but it's possible.
- Also tin-plate the copper and green shielding.

- Use the supplied CAT-5 cable cut of 10-15 cm from each connector and take away 40 mm of the outer cover.
- Separate the pairs.
- Take away 3 mm of the cover from each wire and tin-plate them.
- Identify the following colours:

1. Orange/White
2. Orange
3. Green/White
4. Blue 5. Blue/White
6. Green
7. Brown/White
8. Brown

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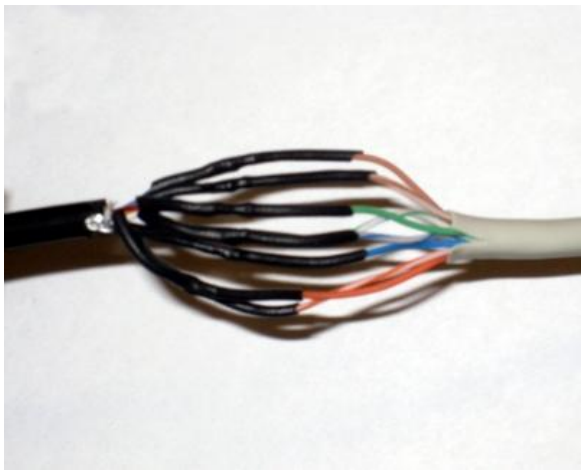
- Cut a piece of shrinking tube to each wire. Cut them short enough so they don't shrink from the heat of the solder iron.

- First tread a 100 mm long 6,4 mm shrinking tube on the separation cable.
- Then tread a 80 mm long 6,4 mm shrinking tube on the separation cable.



- Solder them together, follow the drawing above.
- Tread the shrinking tubes over the soldered joints and shrink them with hot air.

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- Tread the 6.4 mm shrinking tube over the joint and shrink it with hot air.
- Tread the second shrinking tube over the first and shrink them with hot air
- The first cable is now finished, Do the same with the other part. The one with the connector to the control panel.

When you have finished both cables , connect them together with the supplied RJ45 extender.

- Check the cable with an ohm-meter. You should have connection from pin 1 at radio end to pin 1 at radio end etc. Also check for short circuits between the pins.
- Connect the cable between panel and radio and check the functionality. Don't forget the microphone. (this should be done without involving the RRC.s at this moment.

When everything is OK you can connect the cables to the RRC:s

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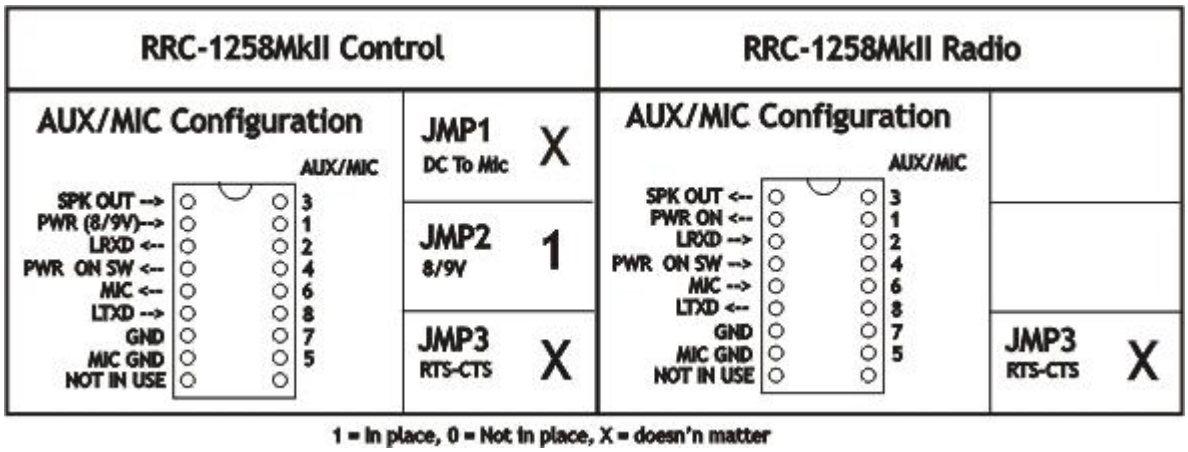
ICOM IC-R2500

General

The technical solution is the same as for IC-706 and TS-480; you can remote control the receiver over Internet from the control panel without any PC. We simply replace the cable between the control panel and the receiver with two RRC-1258 units, one at the control panel and one at the receiver. When you push the PWR-ON button an audio and data connection is established between the units and you control the receiver as you do normally with the control panel attached directly to the receiver.

Hardware configuration



Radio settings (example)

Parameter	Control	Radio
Program mode	7 – ICR2500	7 – ICR2500
SIP password	hello	hello
SIP realm		
SIP contact	192.168.0.228	
Auto connect	No	
Audio quality	2 – Linear 16 bits 8 kHz	2 – Linear 16 bits 8 kHz
Audio dual-rx (*)		No/Yes
Codec out gain	255	255
Codec inp gain	18	0
Codec inp preamp	Yes	
Codec inp HPF Hz	163	163
COM0 baudrate	9600	9600
COM0 data bits	8	8
COM0 stop bits	1	1
COM0 parity	0 - Off	0 - Off

(*) Available only in RRC-1258MkIIs, remember that the bandwidth demand is doubled.

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Connections

The cabling is quite simple and can be done with simple RJ connectors.

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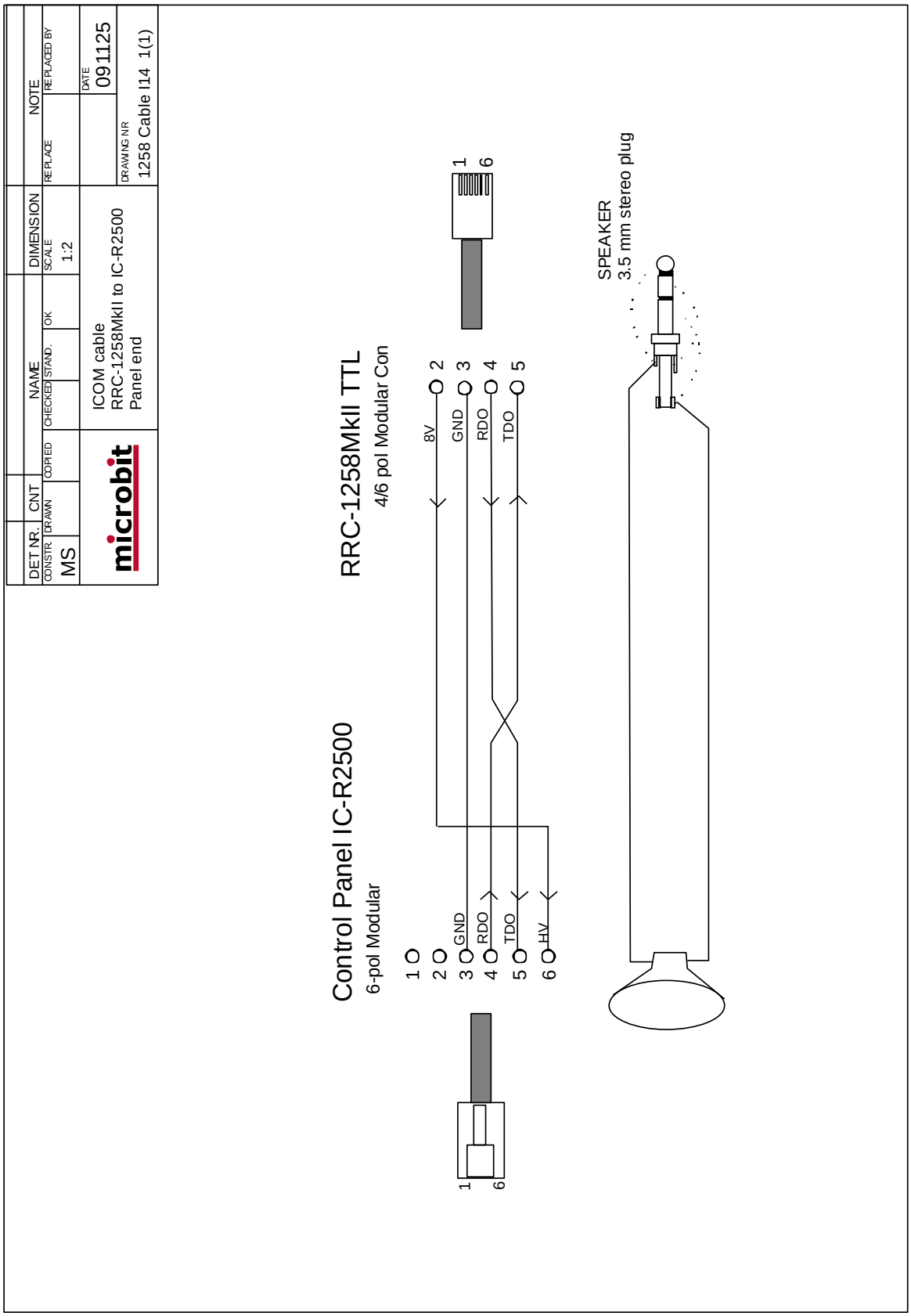

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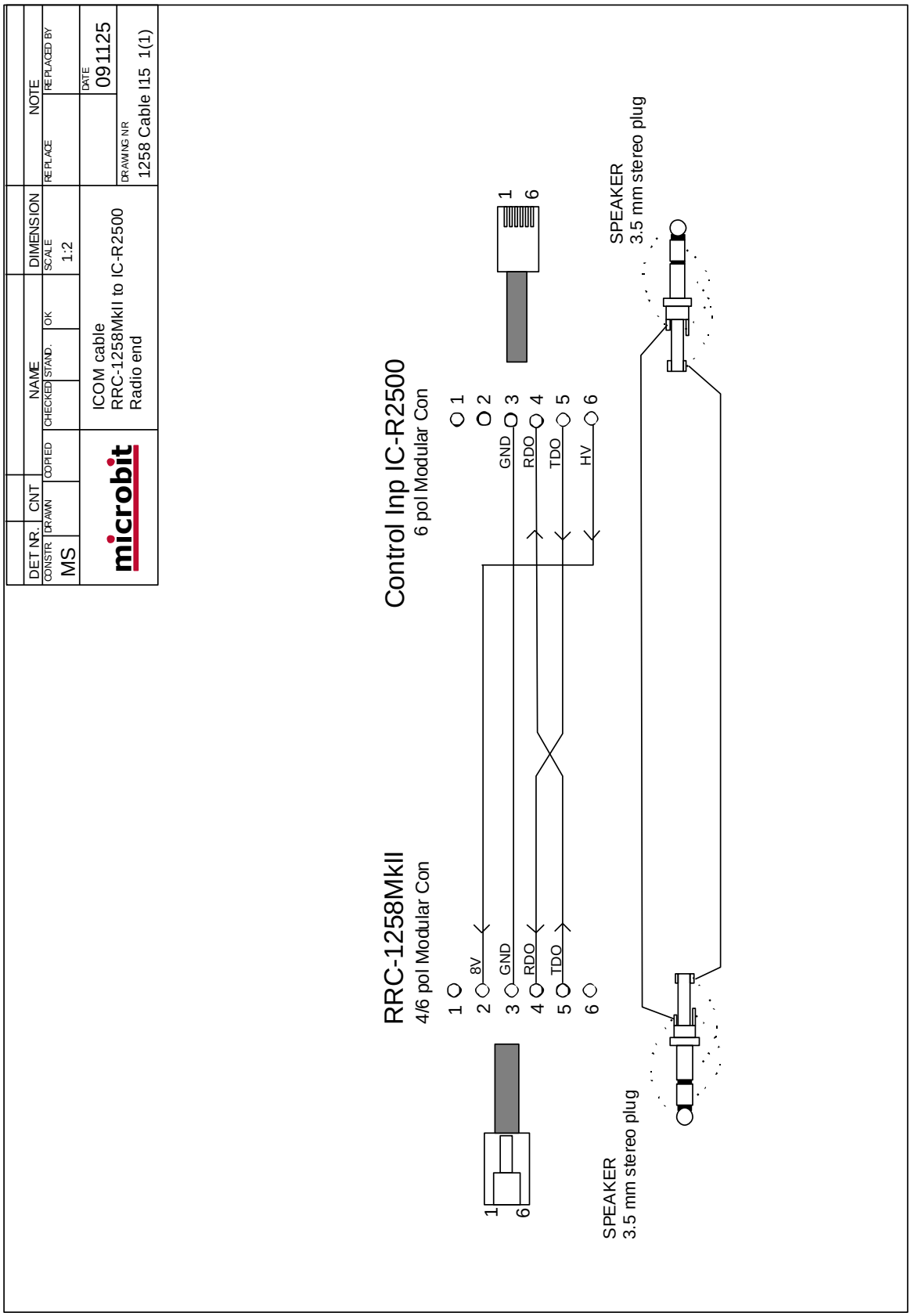

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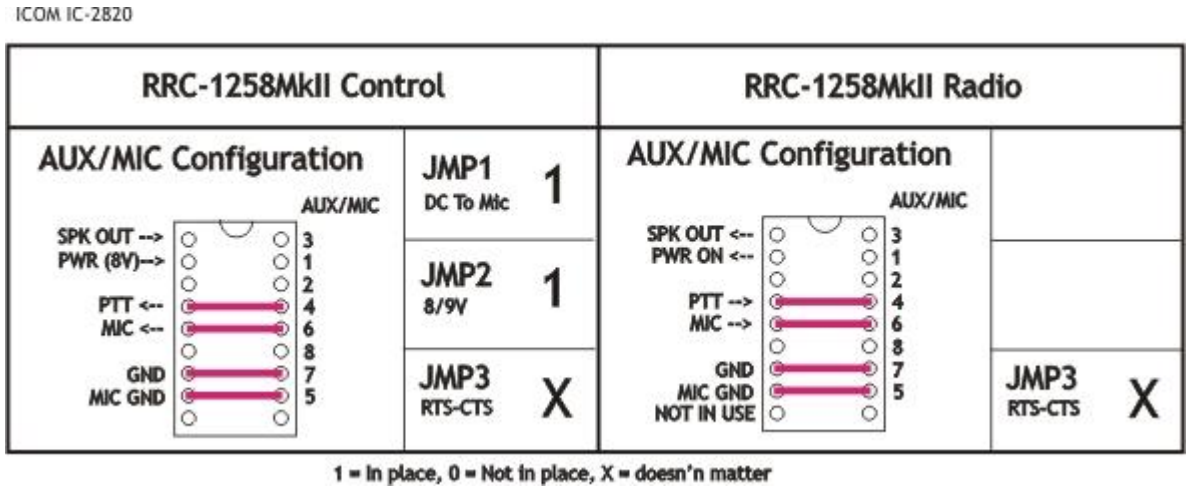
ICOM IC-E2820

General

It's not only shortwave transceivers which could be remote controlled, the remoterig system also support ICOM:s D-star radio IC-E2820. The technical solution is the same as for IC-706 and TS-480; you can remote control the radio over Internet from the control panel without any PC. We simply replace the cable between the control panel and the radio with two RRC-1258 units, one at the control panel and one at the radio. When you push the PWR-ON button an audio and data connection is established between the units and you control the radio as you do normally with the control panel directly attached to the radio.

Hardware configuration



Radio settings (example)

Parameter	Control	Radio
Program mode	9 – IC-E2820	9 – IC-E2820
SIP password	hello	hello
SIP realm		
SIP contact	192.168.0.228	
Auto connect	No	
Audio quality	2 – Linear 16 bits 8 kHz	2 – Linear 16 bits 8 kHz
Audio dual-rx (*)		No
Codec out gain	255	255
Codec inp gain	18	0
Codec inp preamp	Yes	
Codec inp HPF Hz	163	163

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COM0 baudrate	38400	38400
COM0 data bits	8	8
COM0 stop bits	1	1
COM0 parity	0 - Off	0 - Off

(*) Available only in RRC-1258MkIIs

Connections

The cabling is quite simple and can be done with simple RJ connectors. Be aware of that the original microphone is not useable. Use a simple ICOM microphone like HM-103 or HM-95. Microphones with circular connectors can also be used with adapter cable OPC-589.

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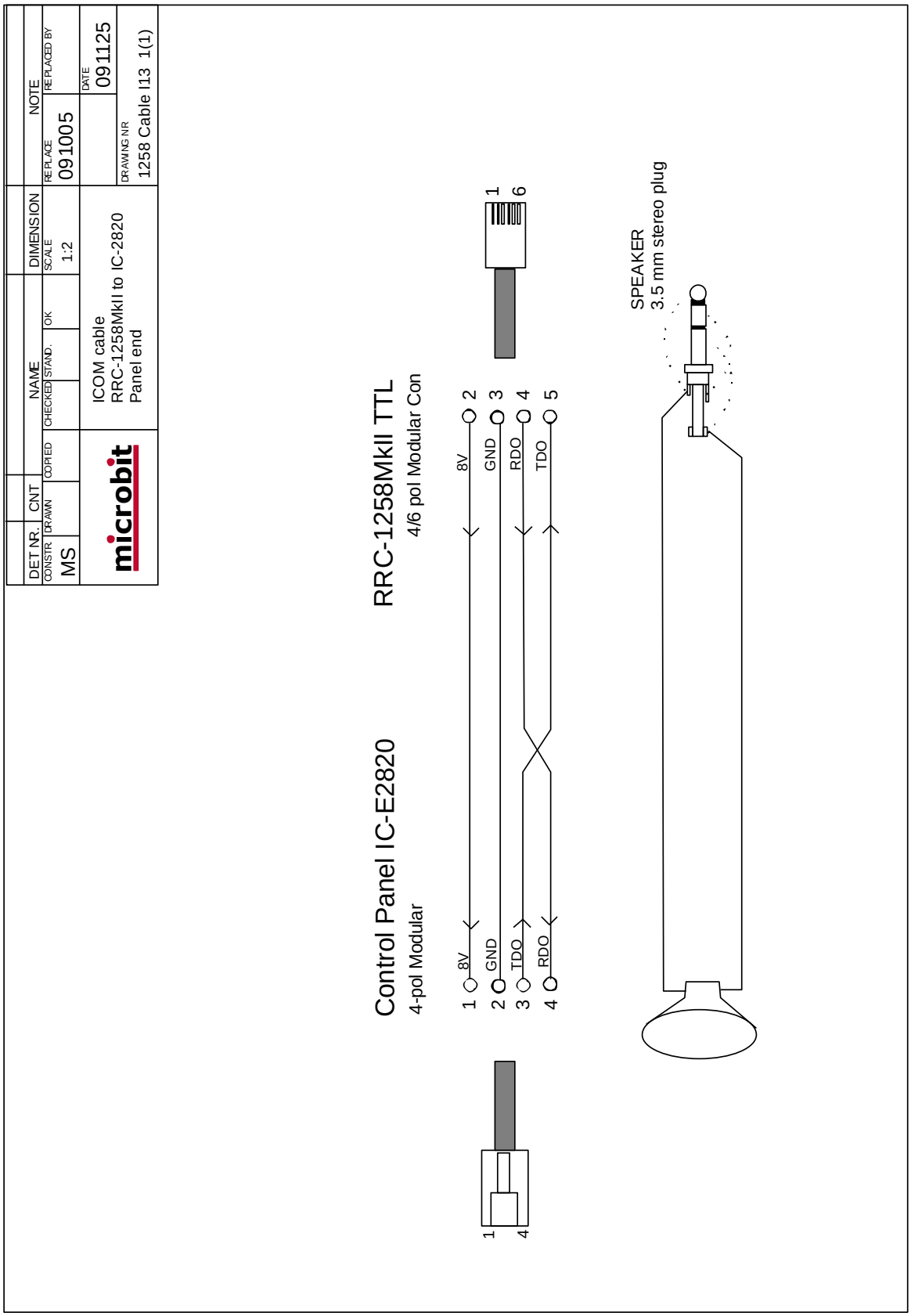

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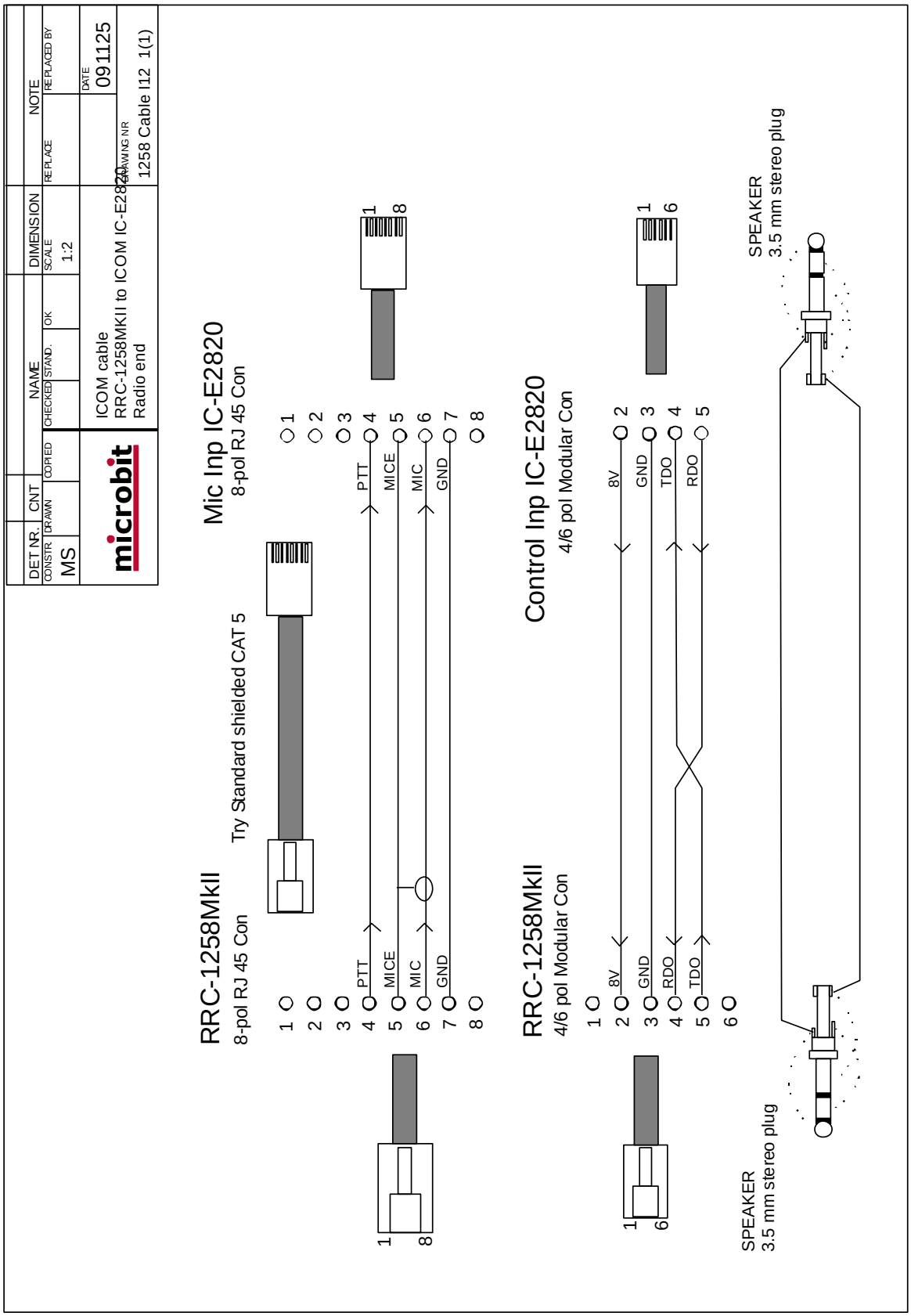

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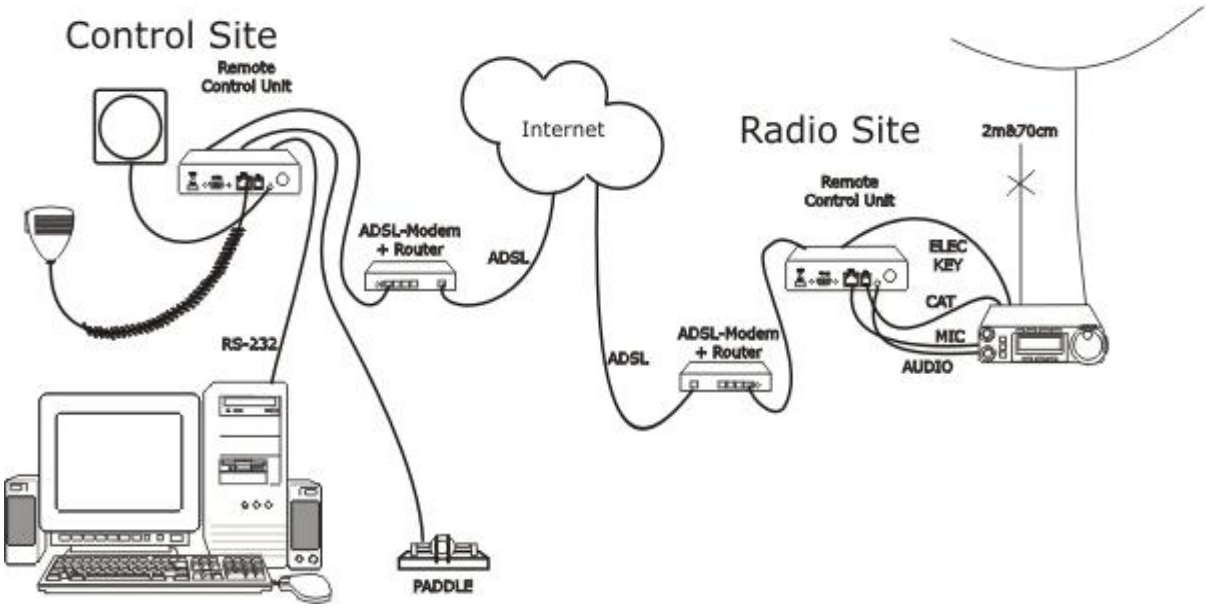
YAESU FT-8x7, FT-1000

General

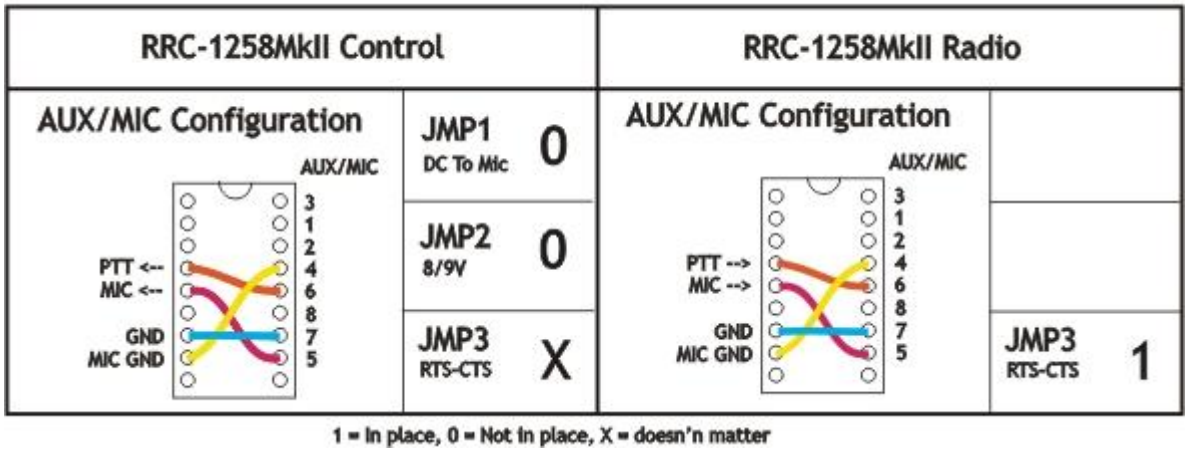


RRC-1258MkII supports the YAESU CAT protocol used by almost every YAESU radio. Then you have to use a PC-software e.g. HamRadioDeLuxe or similar rig control software at the control site. All audio and data communication goes true the RRC:s and you don't need a PC at the remote site.

Hardware configuration

Normal:

Yaesu



1 = In place, 0 = Not in place, X = doesn'n matter

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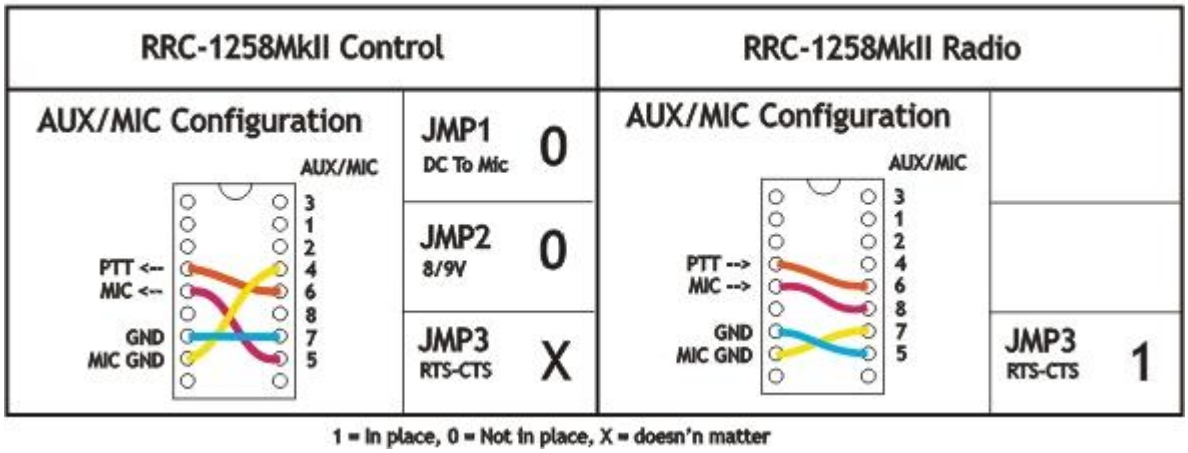
With SLCAB8R adapter cable:

Yaesu SLCAB8R



Radio settings (example)

Parameter	Control	Radio
Program mode	3 – FT-8x7, FT-1000x	3 – FT-8x7, FT-1000x
SIP password	hello	hello
SIP realm		
SIP contact	192.168.0.228	
Auto connect	No	
Audio quality	2 – Linear 16 bits 8 kHz	2 – Linear 16 bits 8 kHz
Audio dual-rx *		No/Yes (ev. for FT-1000xx)
Codec out gain	255	255
Codec inp gain	18	0
Codec inp preamp	Yes	
Codec inp HPF Hz	163	163
COM0 baudrate	9600	9600
COM0 data bits	8	8
COM0 stop bits	1**	1**
COM0 parity	0 - Off	0 - Off

(*) Available only in RRC-1258MkIIs, remember that the bandwidth demand is doubled.
(**) check with the radio users manual, some model need 2 stopbits.

Connections

Drawings of the connection cables can be found under appendix B.

Control-RRC:

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- Connect a standard RS-232 cable between the PC and the RRC COM2.
- The microphone can be connected direct to the RRC AUX/MIC connector if you have a microphone with RJ-45 connector. If you have a microphone with a circular connector you can buy an adapter cable, ADMY-817, from Yaesu or make one by yourself.
- The speaker is connected direct to the RRC SP-jack with a 3.5 mm stereo plug.

Radio-RRC:

- From the RRC COM2 connector to the radios CAT connector (D-sub RS-232) you use a special cable. There are also "off-the-shelf" cables also but not as common as the straight cable. The smaller radios in the FT-8x7 series do not have a D-sub or RS-232 port; they only have a TTL-port accessible via a mini-DIN jack. You can either buy an adapter cable, D-sub to mini-DIN, with a level converter called CT-62 from Yaesu or you can make a cable by yourself and connect it to the RRC TTL connector.
- Between the RRC AUX/MIC connector and the radios microphone jack you can connect a standard patch cable if the radio have a RJ-45 jack. If the radio have a circular microphone jack you need to make an adapter cable by yourself or buy one from e.g. a Tigertronics distributor (for Signallink), its article number is SLCAB8R. If you use Tigertronic cable you need to put the straps different. If you make the cable by yourself, just cut a standard FTP (screened) patch cable and solder an 8-pin circular connector on it. Make the cable as short as possible to prevent it from picking up HF.
- The speaker signal from the radios external speaker jack to the RRC SP jack is connected via a standard "off- the-shelf" cable with 3.5 mm stereo plugs in both ends.

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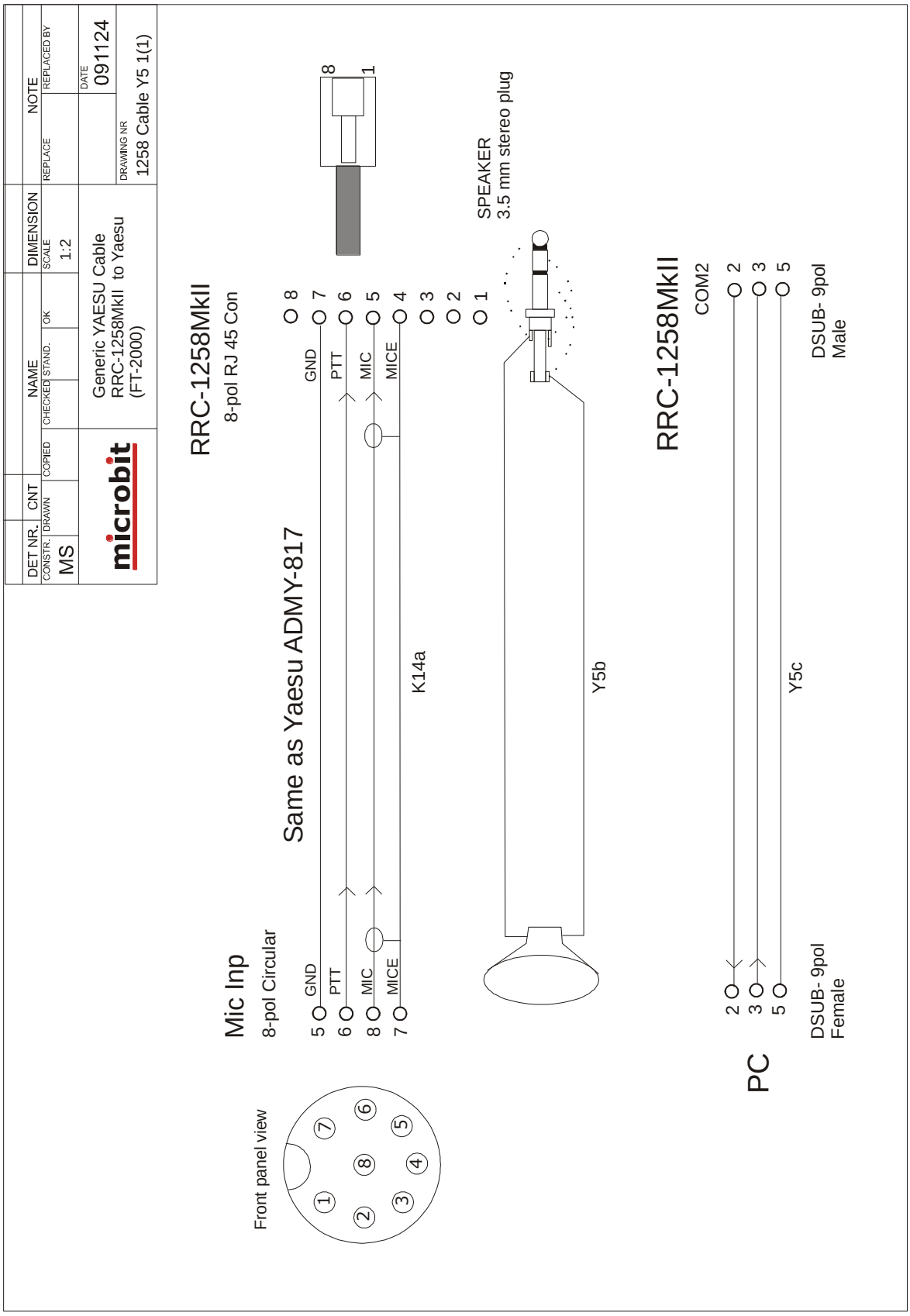

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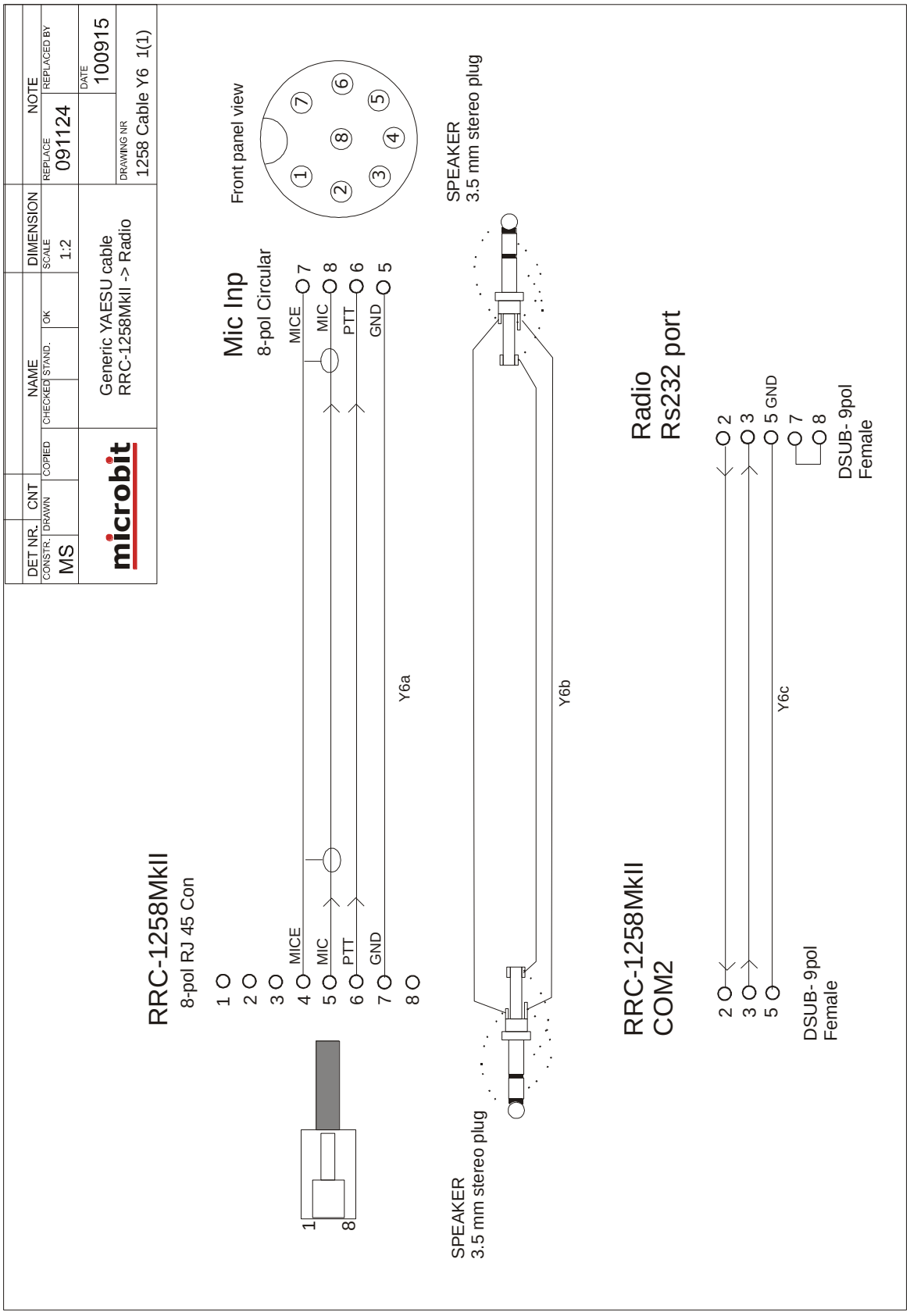

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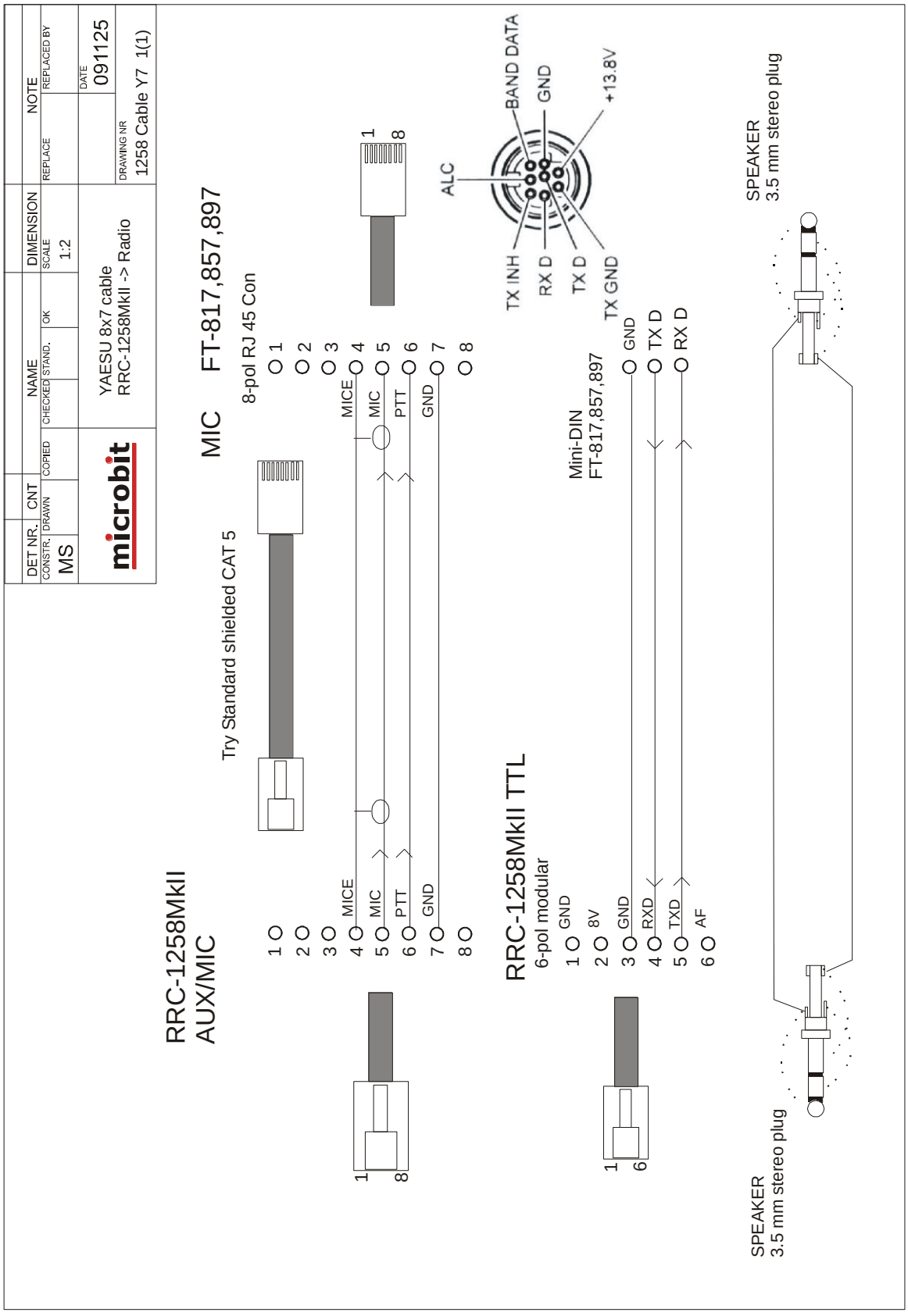

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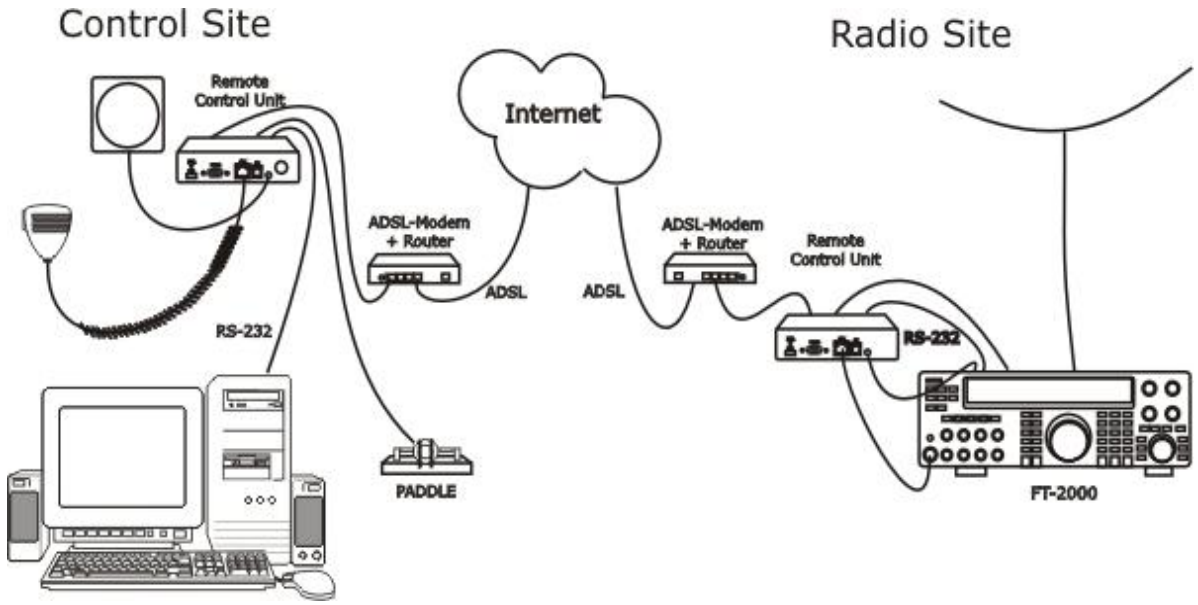
YAESU General (FT-2000)

General

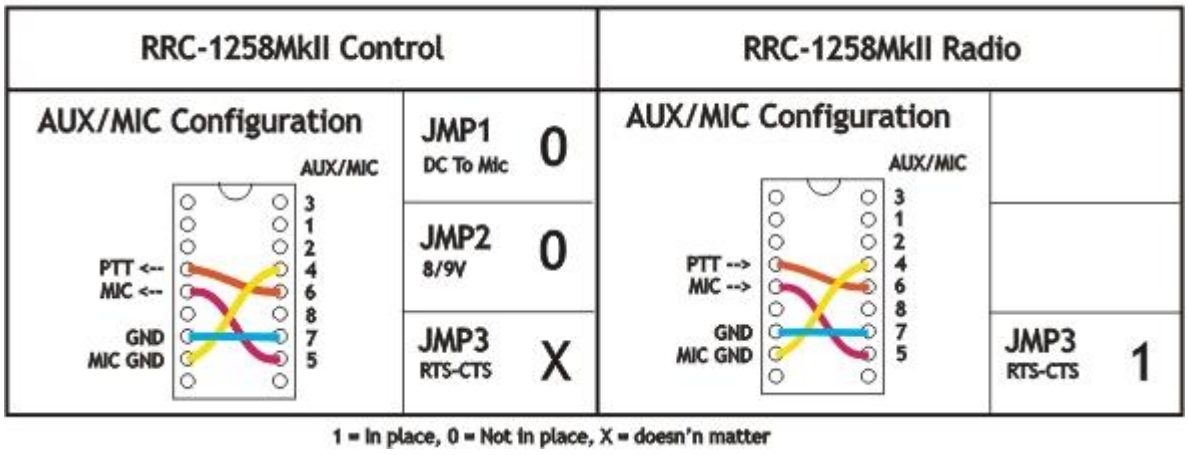


RRC-1258MkII supports the YAESU CAT protocol used by almost every YAESU radio. Then you have to use a PC-software e.g. HamRadioDeLuxe or similar rig control software at the control site. All audio and data communication goes true the RRC:s and you don't need a PC at the remote site.

Hardware configuration

Normal:

Yaesu



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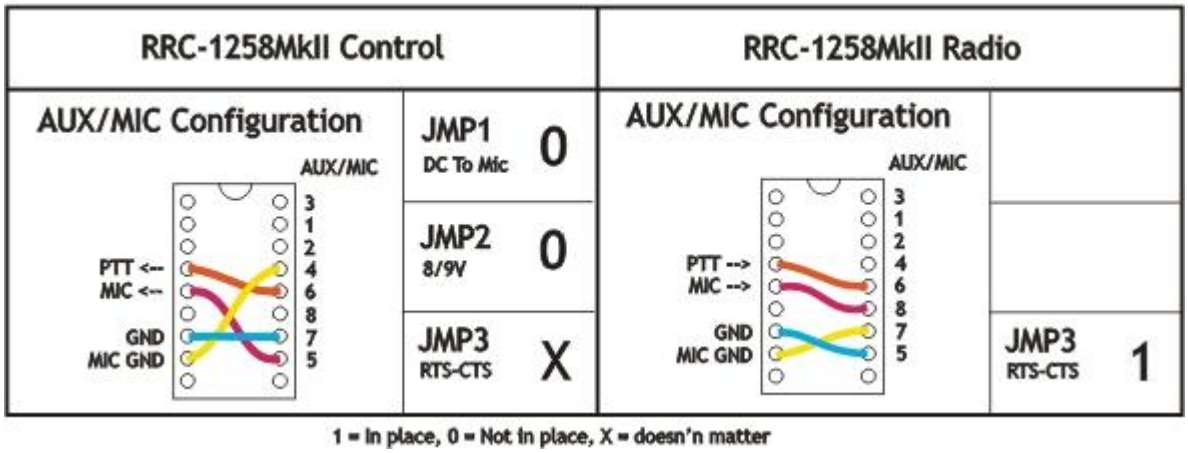
With SLCAB8R adapter cable:

Yaesu SLCAB8R



Radio settings (example)

Parameter	Control	Radio
Program mode	4 – Yaesu, Kenwood, Elecraft	4 – Yaesu, Kenwood, Elecraft
SIP password	hello	hello
SIP realm		
SIP contact	192.168.0.228	
Auto connect	No	
Audio quality	2 – Linear 16 bits 8 kHz	2 – Linear 16 bits 8 kHz
Audio Dual-RX (*)	-	Yes
Codec out gain	255	255
Codec inp gain	18	0
Codec inp preamp	Yes	
Codec inp HPF Hz	163	163
COM0 baudrate	9600	9600
COM0 data bits	8	8
COM0 stop bits	1	1
COM0 parity	0 – Off	0 – Off

(*) Available only in RRC-1258MkIIs, remember that the bandwidth demand is doubled.

Connections

Drawings of the connection cables can be found below.

Control-RRC:

- Connect a standard RS-232 cable between the PC and the RRC COM2.

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- The microphone can be connected direct to the RRC AUX/MIC connector if you have a microphone with RJ-45 connector. If you have a microphone with a circular connector you can buy an adapter cable, ADMY-817, from Yaesu or make one by yourself.
- The speaker is connected direct to the RRC SP-jack with a 3.5 mm stereo plug.

Radio-RRC:

- From the RRC COM2 connector to the radios CAT connector (D-sub RS-232) you use a special cable. There are also "off-the-shelf" cables also but not as common as the straight cable. The smaller radios in the FT-8x7 series do not have a D-sub or RS-232 port; they only have a TTL-port accessible via a mini-DIN jack. You can either buy an adapter cable, D-sub to mini-DIN, with a level converter called CT-62 from Yaesu or you can make a cable by yourself and connect it to the RRC TTL connector.
- Between the RRC AUX/MIC connector and the radios microphone jack you can connect a standard patch cable if the radio have a RJ-45 jack. If the radio have a circular microphone jack you need to make an adapter cable by yourself or buy one from e.g. a Tigertronics distributor (for Signallink), its article number is SLCAB8R. If you use Tigertronic cable you need to put the straps different. If you make the cable by yourself, just cut a standard FTP (screened) patch cable and solder an 8-pin circular connector on it. Make the cable as short as possible to prevent it from picking up HF.
- The speaker signal from the radios external speaker jack to the RRC SP jack is connected via a standard "off- the-shelf" cable with 3.5 mm stereo plugs in both ends.

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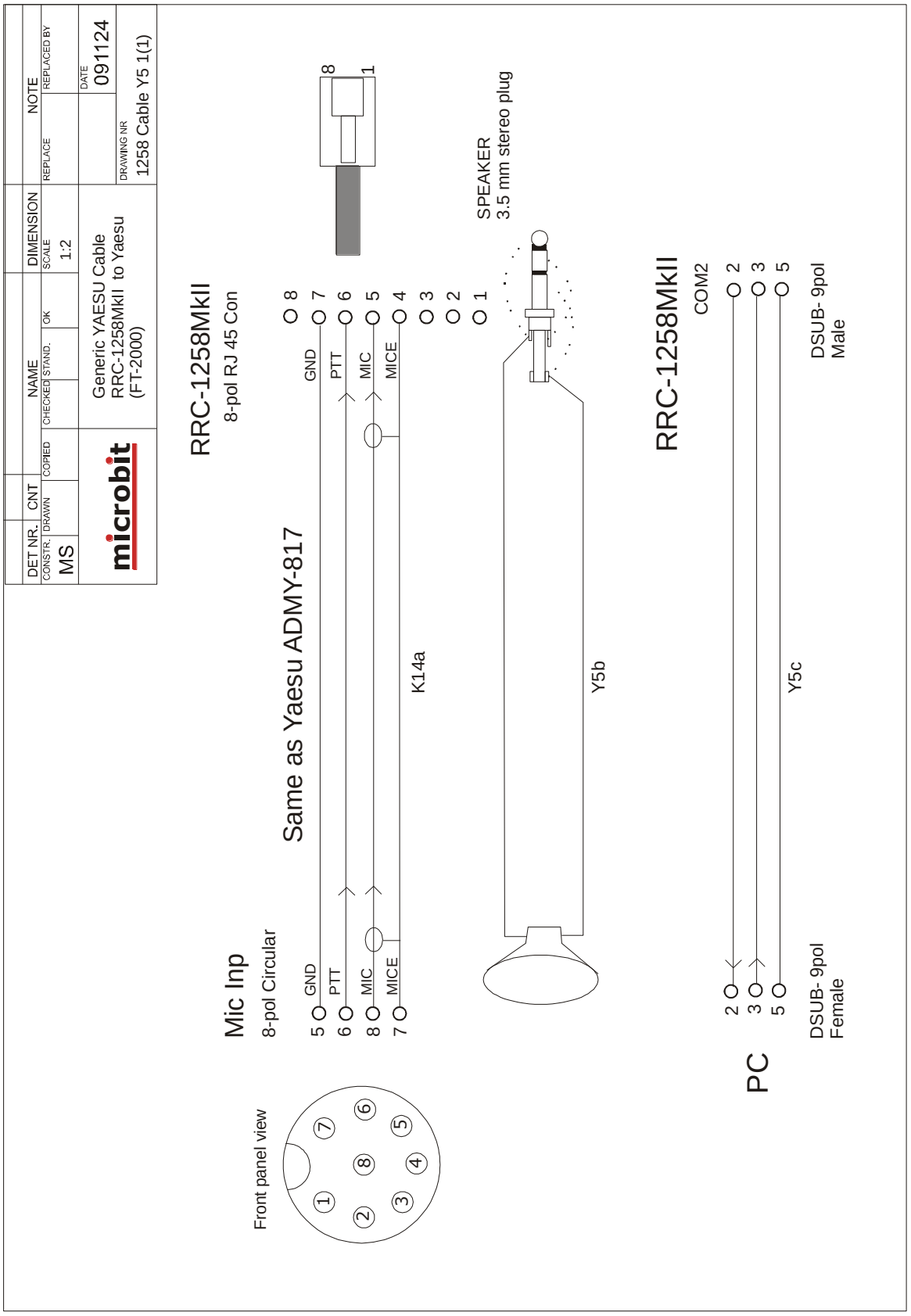

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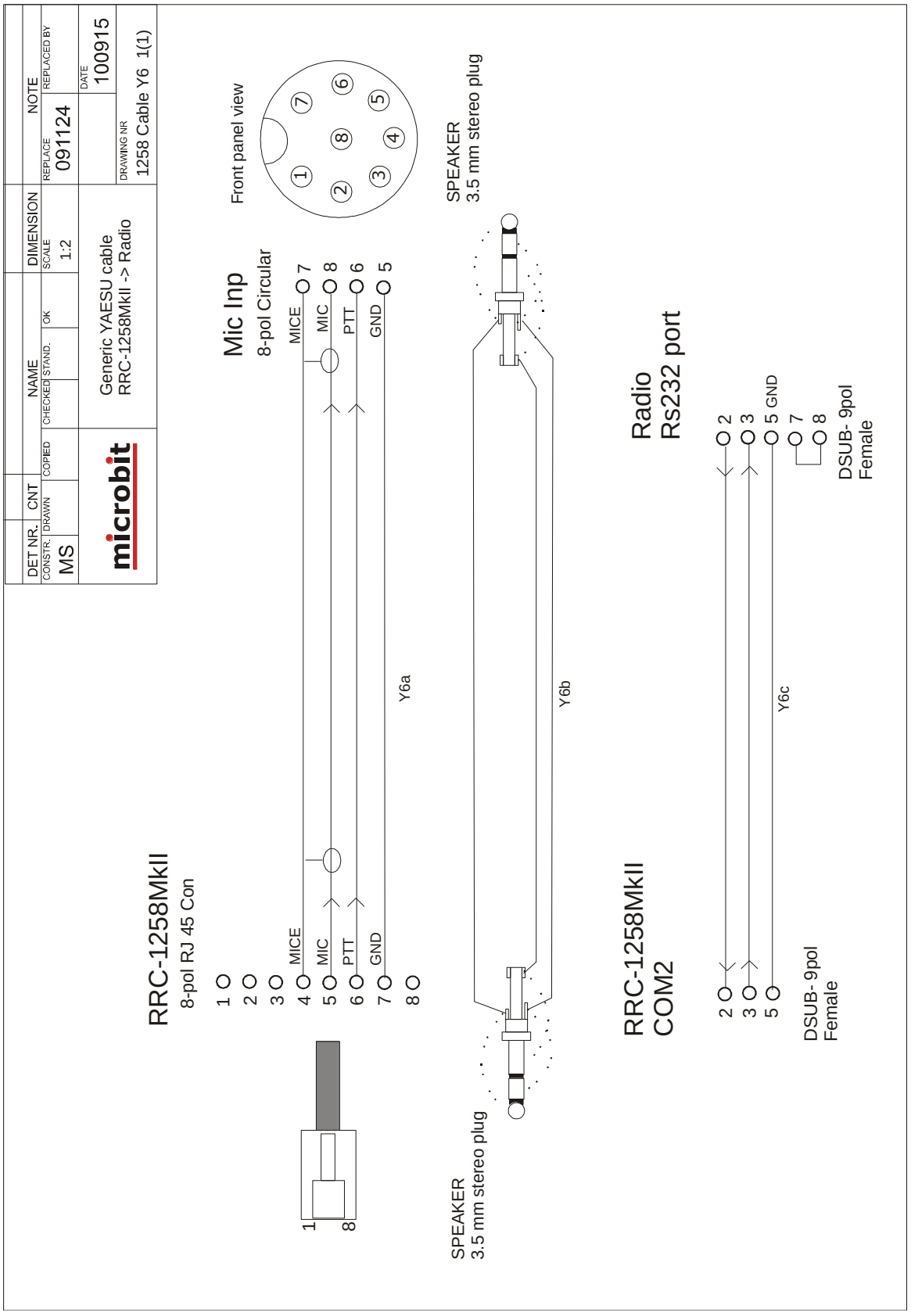

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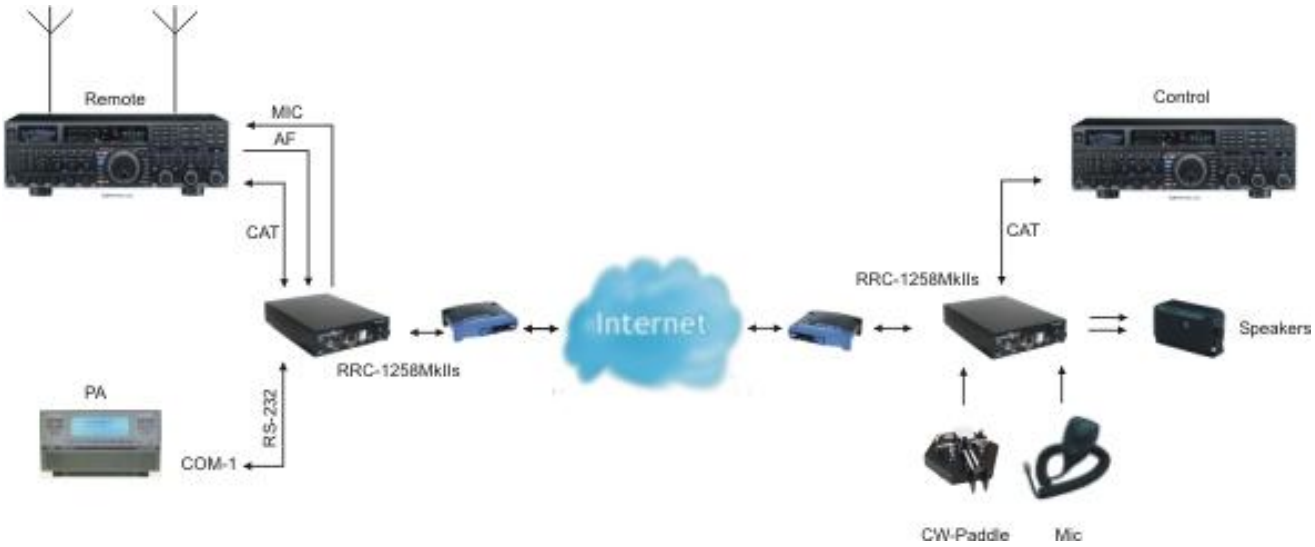
YAESU TWIN

General



RRC-1258MkIIs Yaesu Twin supports the special high end concept where one Yaesu radio can be used to control another Yaesu radio. No PC:s needed at either end. The RRC-1258MkIIs Yaesu Twin package includes power supplys and all necessary cables. The boxes do not need to be opened all strappings are done in production. All you need to do is to put the system together and do the IP-settings.

The twin concept is mainly developed for using with two radios of the same model for example two FT-5000, but two different models can also be used. The following combinations of are tested:

Control	Radio
FT-950	FT-950
FT-2000	FT-2000
FT-5000	FT-5000
FT-950	FT-5000
FT-2000	FT-5000
FT-9000	FT-5000

In the combinations tested above all functions works and are tested by several test pilots, anyway we cannot give any guaranties that we have not missed some minor function when tested. The meter functions in the FT-950 have some limitations, the PWR, SWR and ALC are replicated to the controlling radio but there is no scale marks on the meters so you have to learn how the different values are represented.

Attention!

If you want to use the Auto tuner on the Remote radio, it's very important that you connect dummy loads to the corresponding antenna ports on the control radio. As the radio do not use

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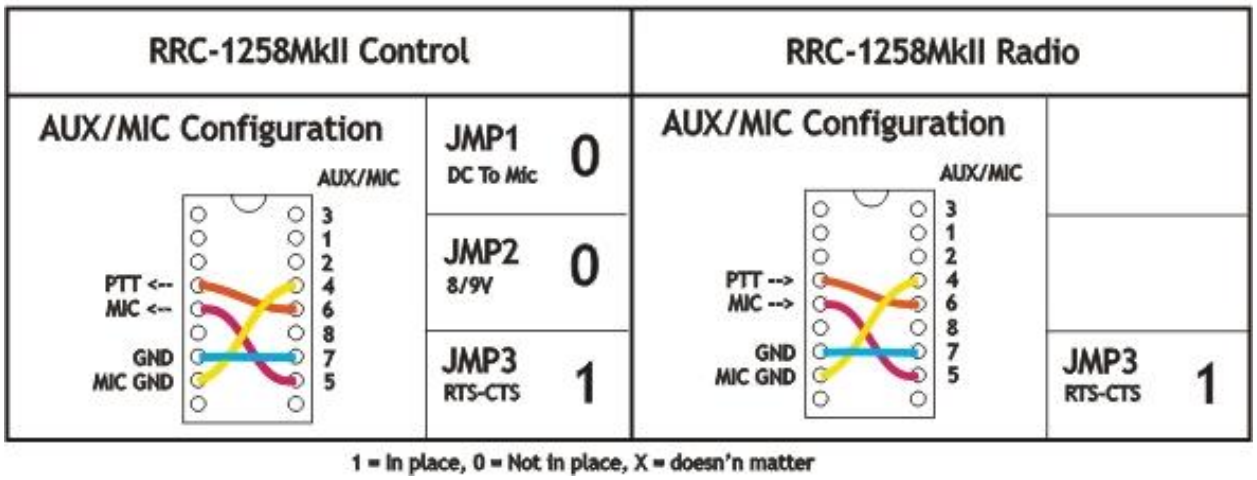
full power when tuning and it's done relatively fast, small and cheap 10-20W dummyloads can be used (not included).

Hardware configuration

In the standard RRC:s the strappings are done manually by the customer, but In the RRC-1258MkIIs Yaesu Twin package the strappings are done by a small pcb marked 1258Y which is assembled at the strapping area. The small pcb is removable if you later want to use the RRC:s for some other configuration. When you replace it is important that the notch which marks pin one is placed according to the picture below.

For your reference the picture below shows how the strappings are done on the small pcb.

Yaesu Twin



1 = In place, 0 = Not in place, X = doesn't matter

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Radio settings (example)

Parameter	Control	Radio
Program mode	10 – Yaesu FT-950/2000/5000/9000 twin	10 – Yaesu FT-950/2000/5000/9000 twin
SIP password	hello	hello
SIP realm		
SIP contact	192.168.0.228	
Auto connect	No	
Audio quality	2 – Linear 16 bits 8 kHz	2 – Linear 16 bits 8 kHz
Audio Dual-RX	-	Yes (*1)
Codec out gain	255	255
Codec inp gain	18	0
Codec inp preamp	Yes	
Codec inp HPF Hz	163	163
COM0 baudrate	38400(*2)	38400(*2)
COM0 data bits	8	8
COM0 stop bits	1	1
COM0 parity	0 – Off	0 – Off

(*1) Remember that the bandwidth demand is doubled if Dual-RX is activated.
(*2) Set the CAT speed in both Radios also to 38400 baud.

Connections

Drawings of the connection cables can be found below.

All necessary cables are included in the package.

Cable Y5d – Control Radio to Control-RRC COM2

Cable Y6d – Radio-RRC to Remote Radio COM2

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Cable Y5a – Mic to Control-RRC Mic jack

Cable Y6a – Radio-RRC Mic jack to Radio Mic input

Cable 3.5 mm – 3.5 mm Audio Output from Remote radio to Radio-RRC SP input jack

Cable 3.5 mm – 3.5 mm Keyer in from Radio-RRC PAD jack Remote radio keyer input jack

Adpater ¼”” to 3.5 mm Headset adapter

Adapter ¼”” to 3.5 mm Paddle adapter

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Adapter 3.5 mm to ¼" Headset output adapter from remote remote radio

Adapter 3.5 mm to ¼" Paddle input adapter to remote radio

Control-RRC:

- Connect the RS-232 cable Y5d between the Control-RRC COM2 and the CAT connector on the Radio.
- The microphone can be connected direct to the RRC AUX/MIC connector if you have a microphone with RJ-45 connector. If you have a microphone with a circular connector use the adapter cable Y5a.
- The speaker is connected direct to the RRC SP-jack with a 3.5 mm stereo plug.
- Paddles are connected to the PAD jack. If you the paddles have a ¼" plug on your paddle use the supplied ¼" to 3.5 mm adapter cable.
- Connect the CAT 5 cable from the Ethernet jack to your switch or router
- Connect the 12V power supply to the DC jack

Radio-RRC:

- Connect the RS-232 cable Y6d from the Radio-RRC COM2 connector to the radios CAT connector.
- Connect the mic cable Y6a from the Radio-RRC AUX/MIC connector to the radios microphone jack.
- Connect the speaker signal from the radios headset output jack or similar to the Radio-RRC SP jack with the standard 3.5 mm – 3.5 mm cable with stereo plugs in both ends. If the radio have a ¼" jack use the supplied adapter ¼"" to 3.5mm.
- Connect keyer cable (standard 3.5 mm – 3.5 mm cable with stereo plugs in both ends) from the Radio-RRC PAD jack to the straight key input jack on the Radio. If the radio have a ¼" jack, use the supplied 3.5 mm to ¼" adapter.
- Connect the CAT 5 cable from the Ethernet jack to your switch or router
- Connect the 12V power supply to the DC jack

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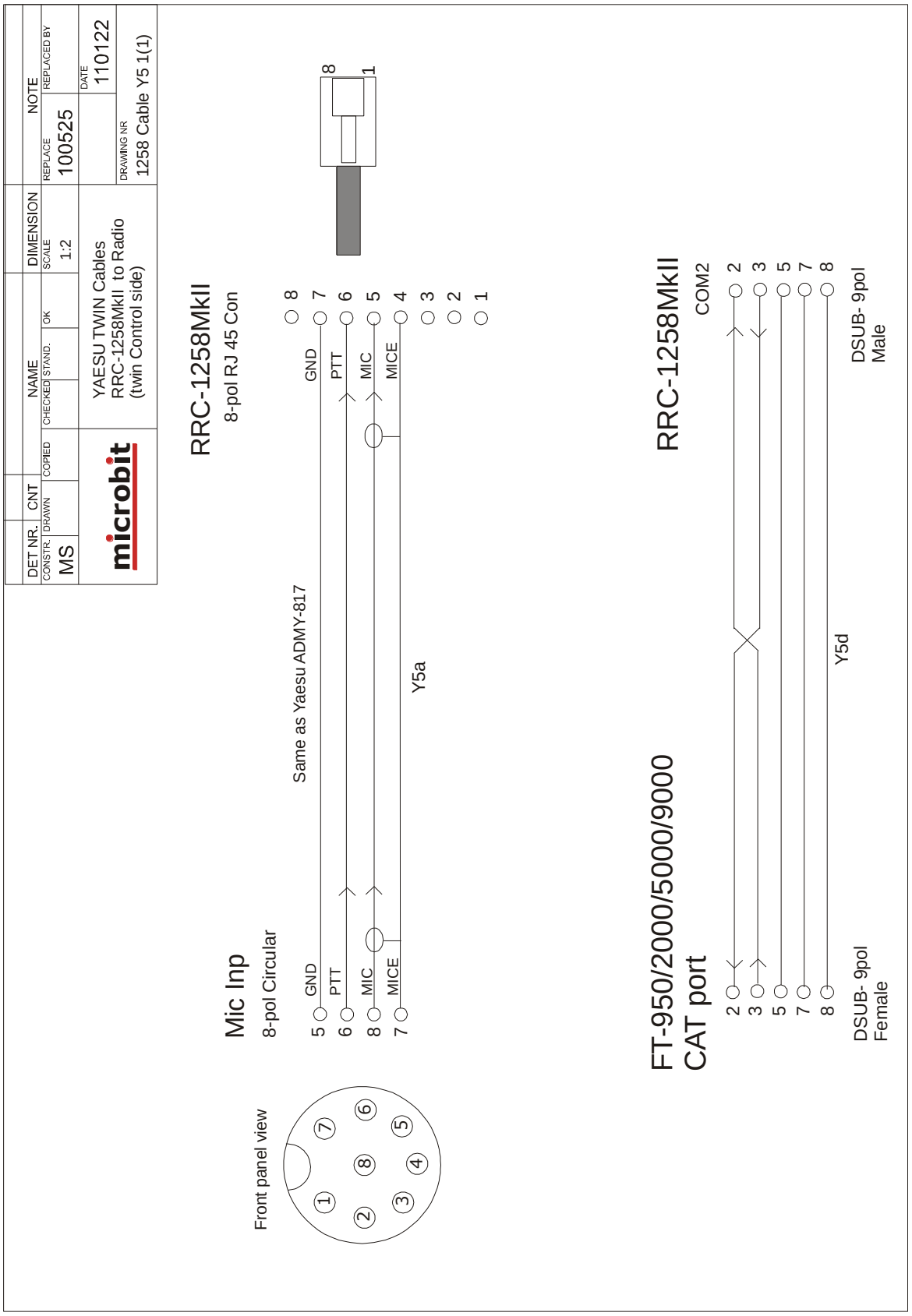

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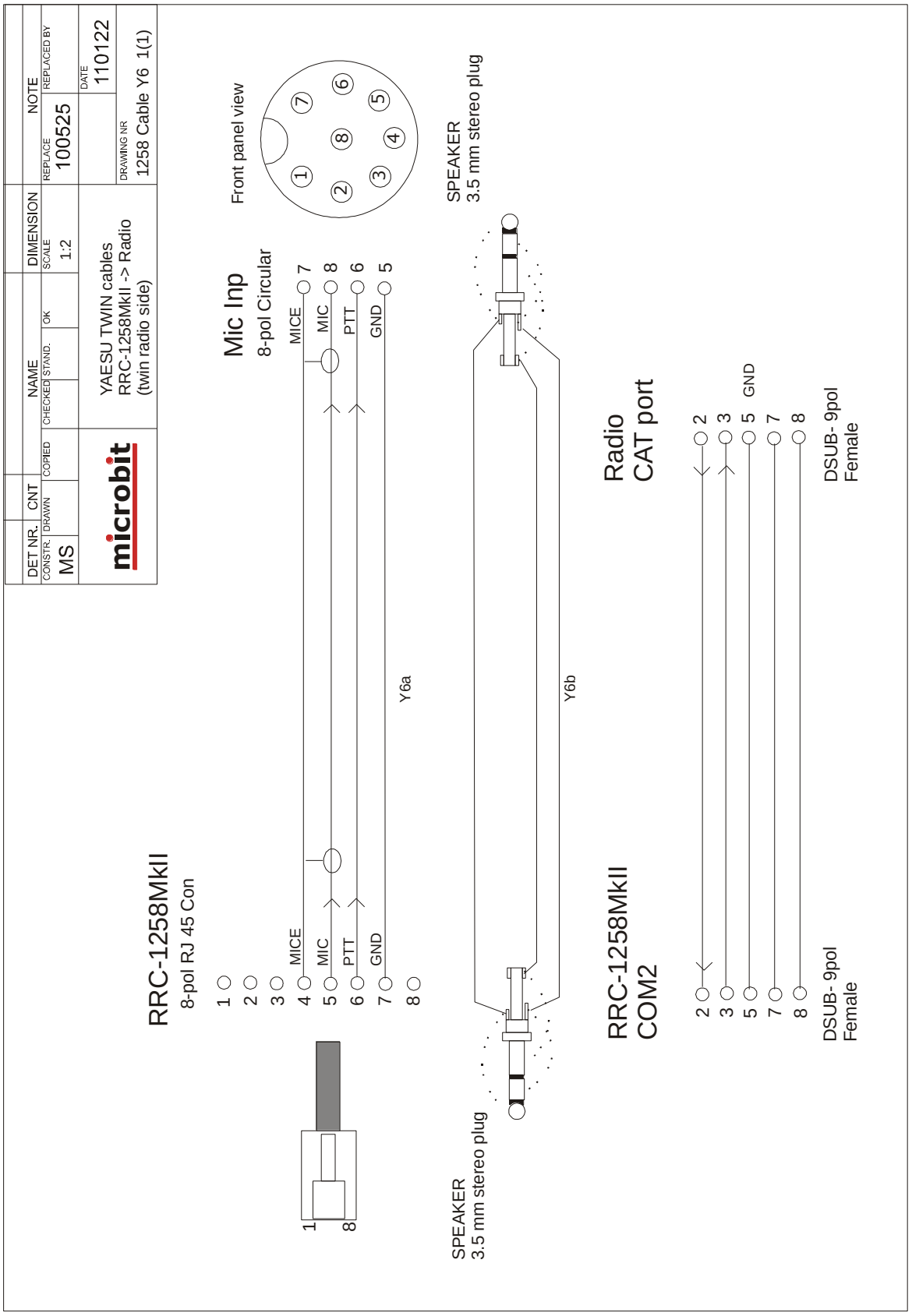

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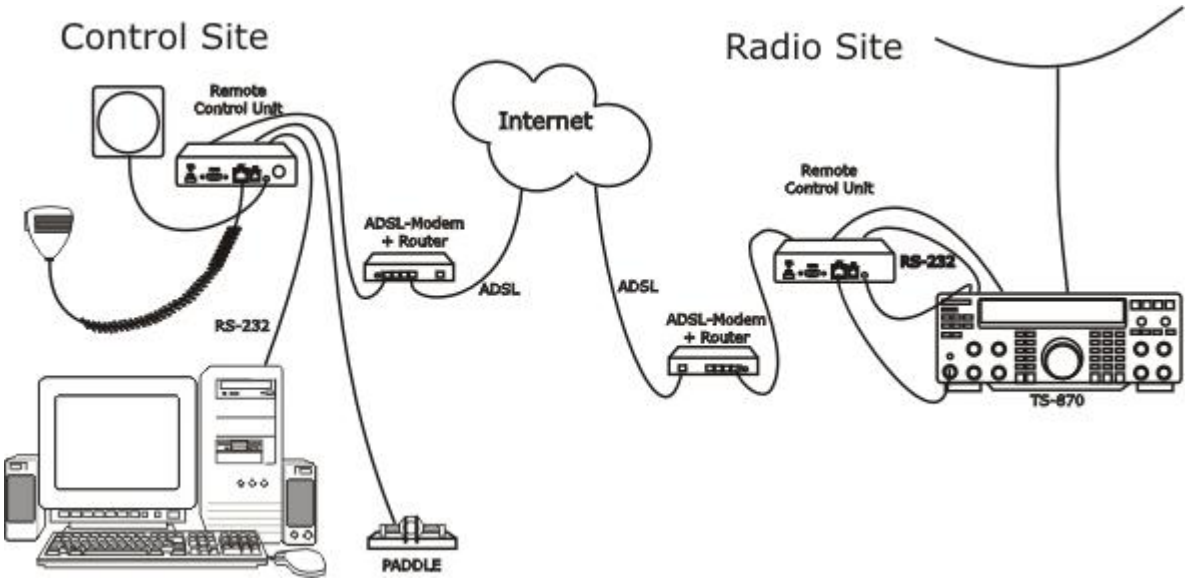
KENWOOD General

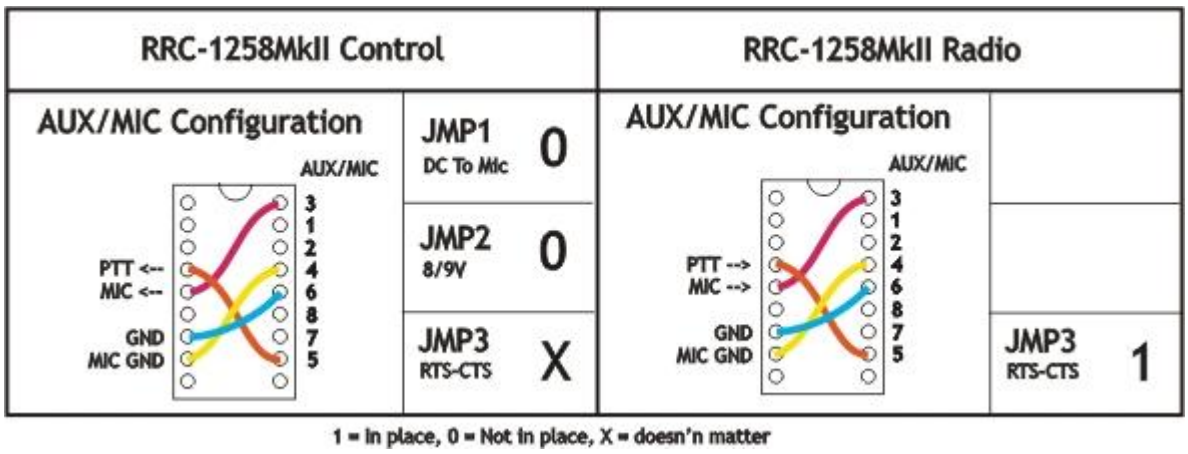
General



RRC-1258MkII supports the Kenwood protocol used by almost every Kenwood radio. Then you have to use a PC-software e.g. HamRadioDeLuxe or similar rig control software at the control site. All audio and data communication goes true the RRC:s and you don't need a PC at the remote site.

Hardware configuration

Normal:



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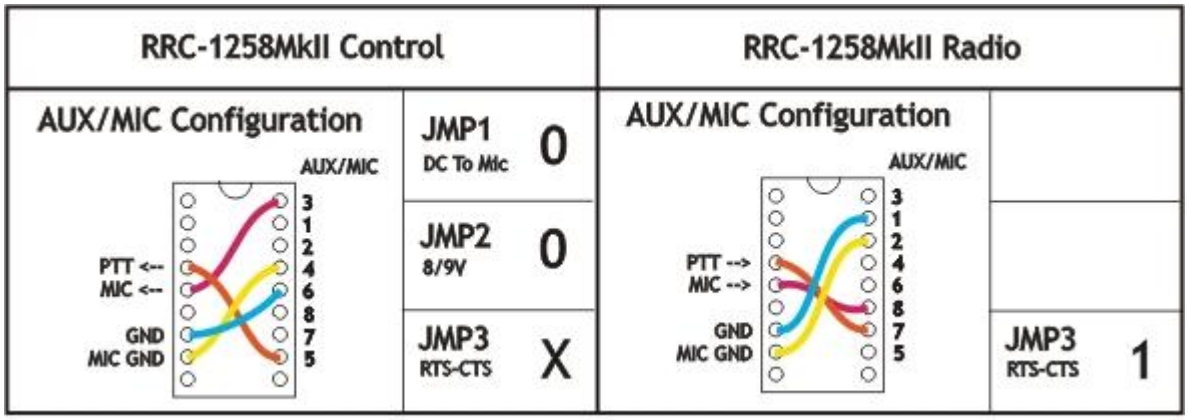
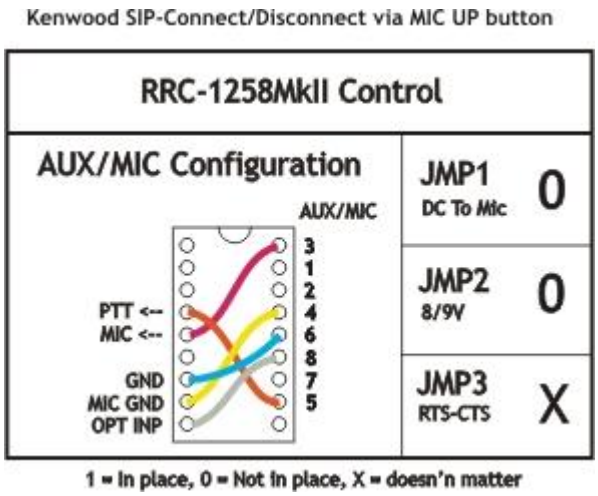
With SLCAB8R adapter cable:



SIP-Connect/disconnect via MIC UP button:



Radio settings (example)

Parameter	Control	Radio
Program mode	4 – Yaesu, Kenwood, Elecraft	4 – Yaesu, Kenwood, Elecraft
SIP password	hello	hello
SIP realm		
SIP contact	192.168.0.228	
Auto connect	No	
Audio quality	2 – Linear 16 bits 8 kHz	2 – Linear 16 bits 8 kHz
Audio dual-rx (*)		No
Codec out gain	255	255
Codec inp gain	13	0
Codec inp preamp	Yes	
Codec inp HPF Hz	163	163
COM0 baudrate	9600	9600

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COM0 data bits	8	8
COM0 stop bits	1	1
COM0 parity	0 - Off	0 - Off

*) Available only in RRC-1258MkIIs.

Connections

Drawings of the connection cables can be found under appendix B.

Control-RRC:

- Connect a standard RS-232 cable between the PC and the RRC COM2.
- The microphone can be connected direct to the RRC AUX/MIC connector if you have a microphone with RJ-45 connector. If you have a microphone with a circular connector you can buy an adapter cable, MJ-88, from Kenwood or make one by yourself.
- The speaker is connected direct to the RRC SP-jack with a 3.5 mm stereo plug.

Radio-RRC:

- From the RRC COM2 connector to the radios CAT connector (D-sub RS-232) you use a special cable. There are also "off-the-shelf" cables also but not as common as the straight cable.
- Between the RRC AUX/MIC connector and the radios microphone jack you can connect a standard patch cable if the radio have a RJ-45 jack. If the radio have a circular microphone jack you need to make an adapter cable by yourself or buy one from e.g. a Tigertronics distributor (for Signallink), its article number is SLCAB8R. If you use Tigertronic cable you need to put the straps different. If you make the cable by yourself, just cut a standard FTP (screened) patch cable and solder an 8-pin circular connector on it. Make the cable as short as possible to prevent it from picking up HF.
- The speaker signal from the radios external speaker jack to the RRC SP jack is connected via a standard "off- the-shelf" cable with 3.5 mm stereo plugs in both ends.

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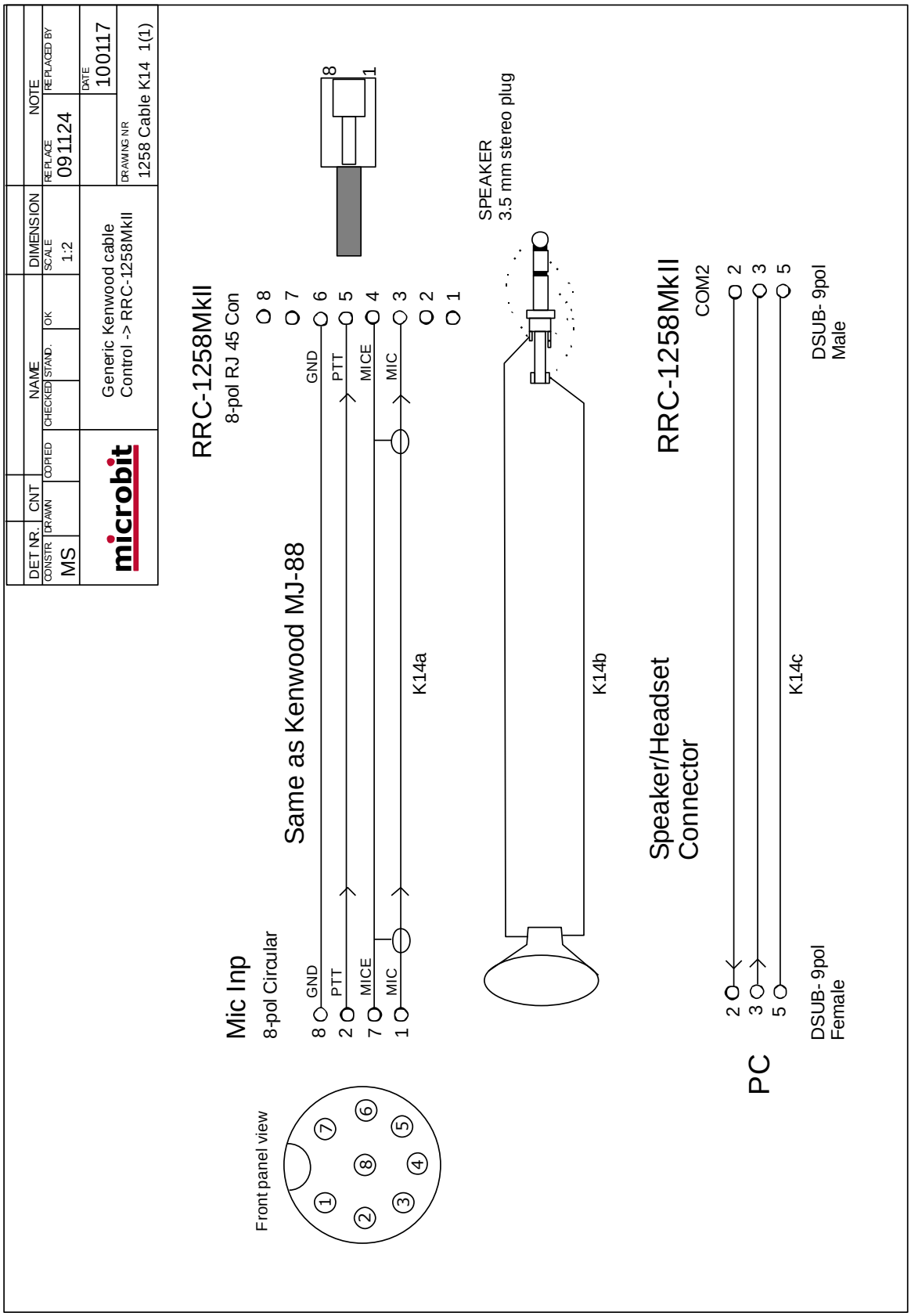

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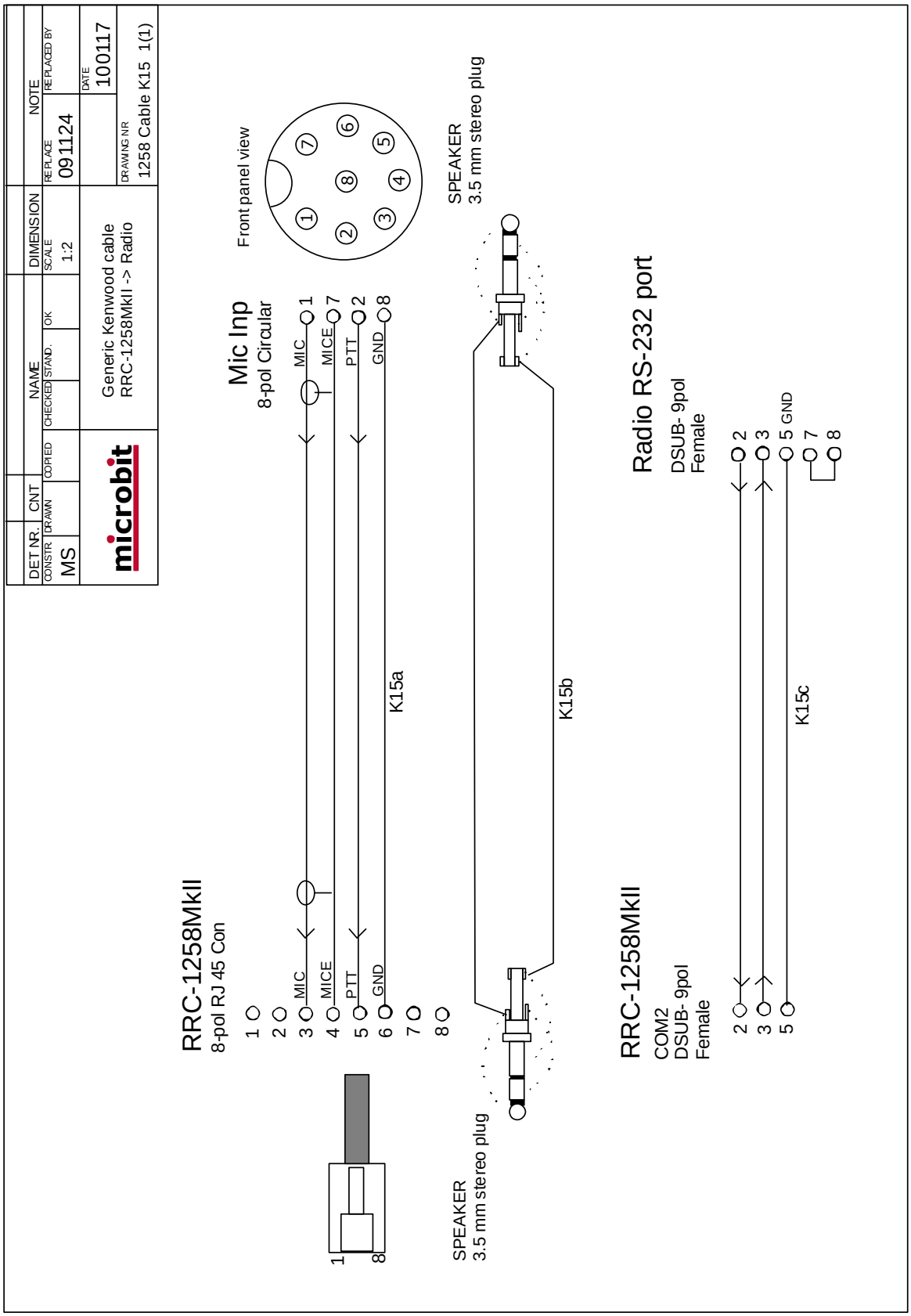

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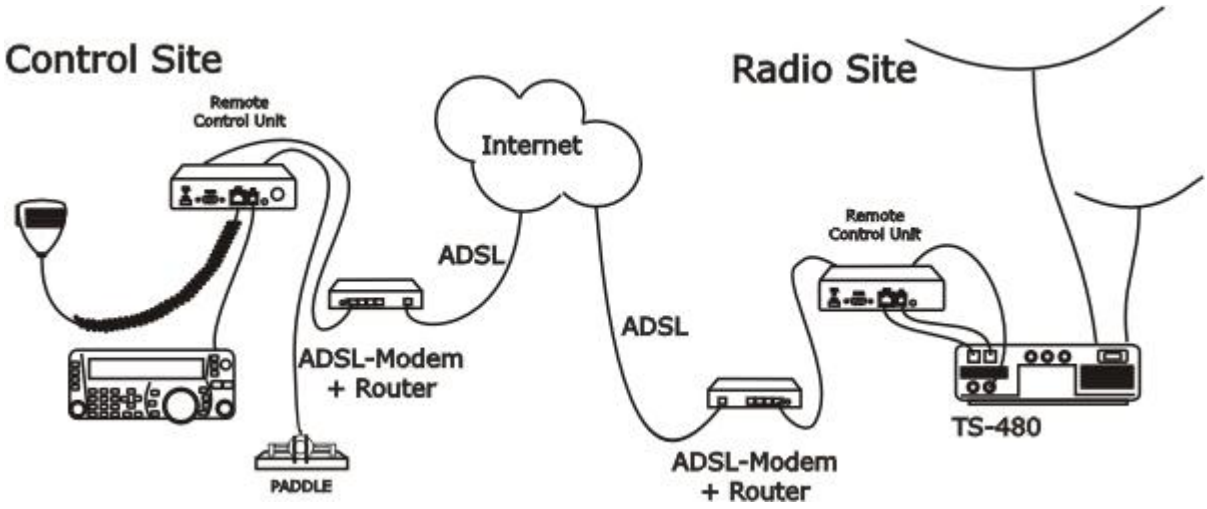
KENWOOD TS-480

General

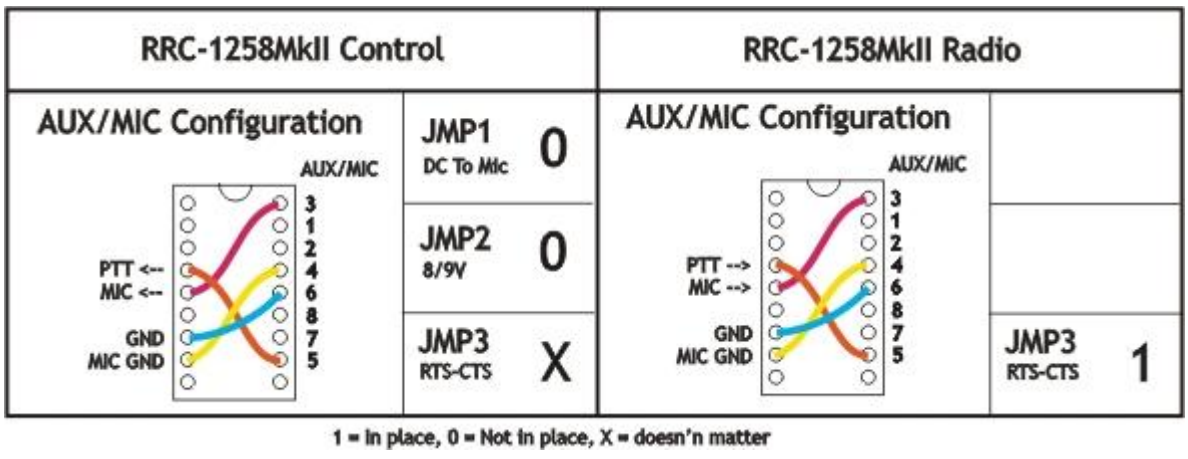


The idea of remote controlling TS-480 is simple; it's just to extend the cord between the radio and the control panel using Internet. When you press the power button on the panel the radio comes to life at the remote side and sound and panel info flows across the Internet between the pair of RRC-1258MkII:s. The look and feel of the panel is the same as if the panel was directly connected to the radio.

Hardware configuration

To make things a little bit more complicated Kenwood have changed the layout of the Mic connector during production and there are two different configurations. New radios with serial number from 70600056 are using Configuration type 1 and older radios with serial number below are using configuration type 2.

Configuration type 1:



1 = in place, 0 = Not in place, X = doesn't matter

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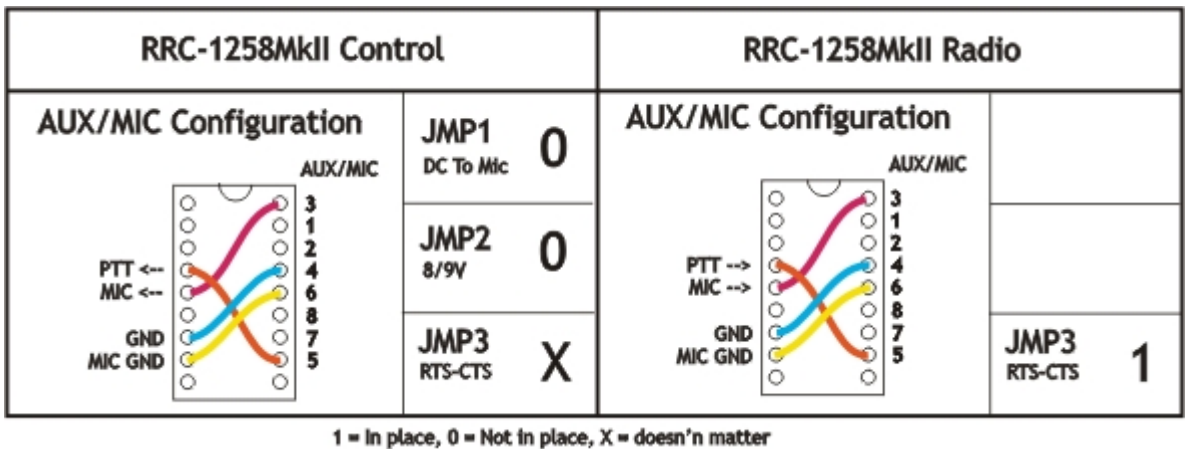
Configuration type 2:



Radio settings (example)

Parameter	Control	Radio
Program mode	5 – TS480/TM-D710	5 – TS480/TM-D710
SIP password	hello	hello
SIP realm		
SIP contact	192.168.0.228	
Auto connect	No	
Audio quality	2 – Linear 16 bits 8 kHz	2 – Linear 16 bits 8 kHz
Audio dual-rx (*)		No
Codec out gain	255	255
Codec inp gain	13	0
Codec inp preamp	Yes	
Codec HPF Hz	163	163
COM0 baudrate	57600	57600
COM0 data bits	8	8
COM0 stop bits	1	1
COM0 parity	0 - Off	0 - Off

*) Available only in RRC-1258MkIIs.

Connections

All necessary signals between the panel and the radio are connected with the 6 wires in the connection cable. We just need to cut it apart and connect a RRC-1258MkII in each end. Convenient for travelling is that the speaker is already present on the back of the control panel so there is no need for an extra speaker, even if a separate speaker gives a much better audio. The following signals are represented in the connection cable (6-pol modular):

1 SPK GND - speaker ground
2 8V power to control panel (always present)
3 GND

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4 RDO - serial data 57600 bps from radio to panel
5 TDO - serial data 57600 bps from panel to radio
6 AF - audio to speaker.

The easiest way to make these two cables from Control panel to Control-RRC TTL connector and from Radio-RRC TTL connector to radio is to cut the cable supplied by Kenwood into two pieces. You only have to crimp two new 6/6 modular connectors on the cables. Don't make the one between Radio-RRC and radio to long.

The long Microphone extension cable supplied by Kenwood can also be used between Radio-RRC AUX/MIC connector to the radio Microphone jack. Probably you need to cut it later to prevent it from picking up HF from your antennas.

If the TS-480 is provided with a microphone with RJ-45 connector you can connect it directly to the AUX/MIC connector on the Control-RRC. If it's provided with a circular 8 pin connector you can used the adapter cable MJ-88 supplied by Kenwood with your TS-480 as a adapter between the Microphone and the AUX/MIC connector.

Connection type 1

Modular 8-pol connector:

3 MIC- mic Signal
4 MICE - mic ground
5 PTT
6 GND PTT

Connection type 2

Modular 8-pol connector:

3 MIC- mic Signal
4 GND PTT
5 PTT
6 MICE - mic ground

If you use the wrong configuration everything will work but the system will be very sensitive for HF (RFI).

Power supply

Control-RRC:

The Control-RRC is supplied with a common 13,8 V (10-18V) power supply. The display and speaker amplifier needs a lot of power so you need at least 1A.

Radio-RRC:

The Radio-RRC could be powered with a separate Power supply or the same as the radio. If you use the Radio PS make sure you have a 1A fuse on the output to the RRC. Do not connect it direct to a 20-40A PS the cable will melt if something happens.

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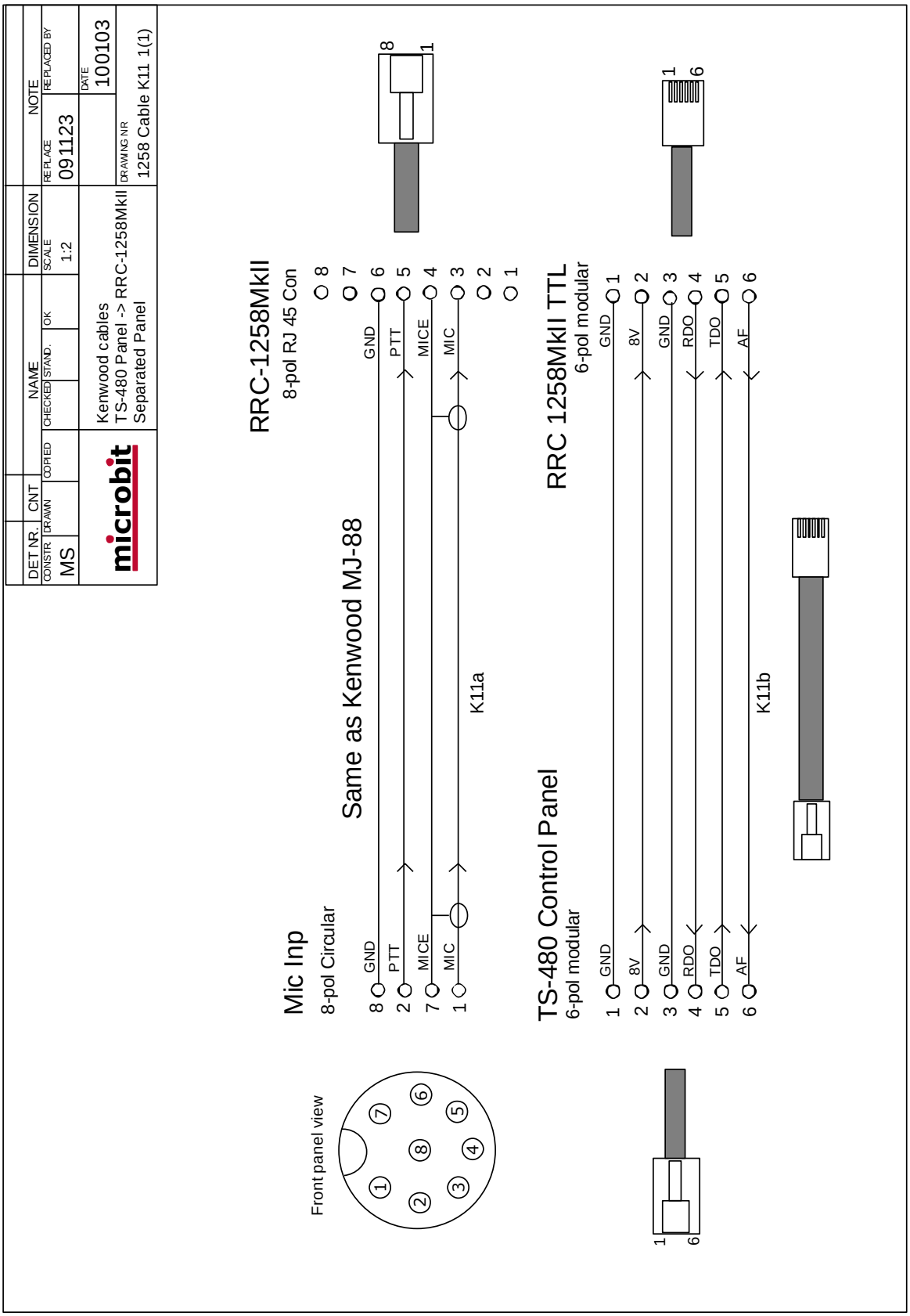

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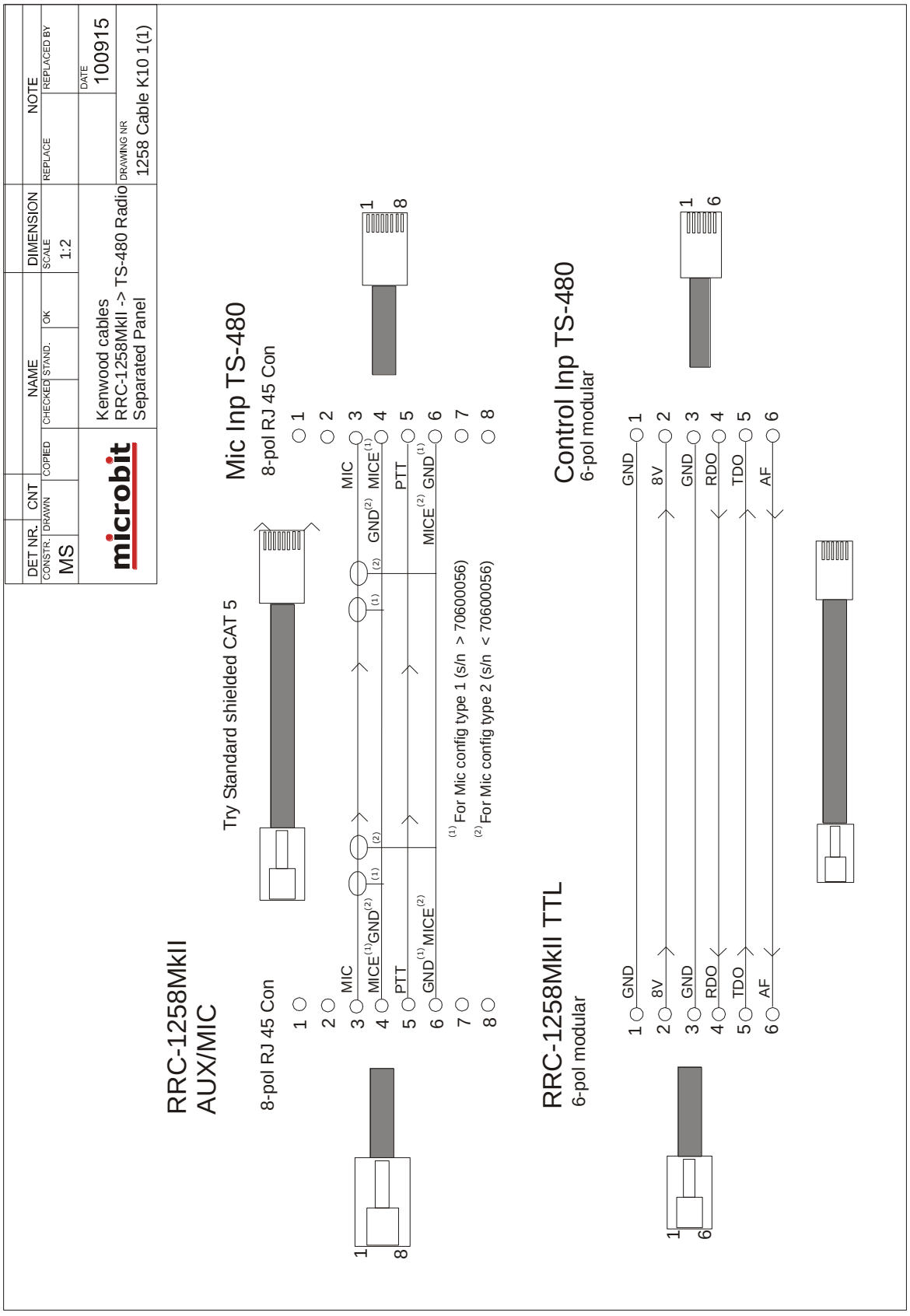

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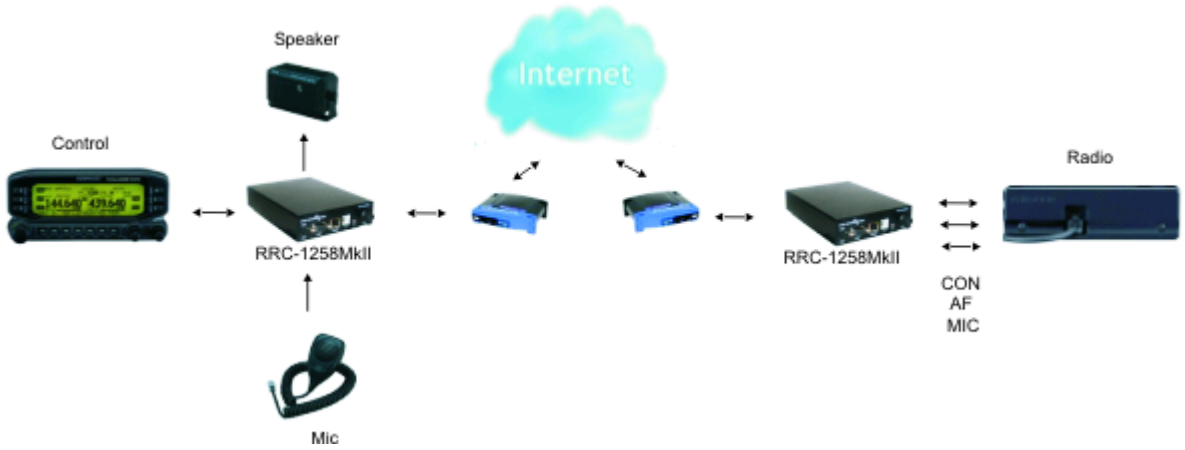
KENWOOD TM-D710

General



The Kenwood TM-D710 is a modern dual band FM-transceiver with separate control panel which is perfect for remote control via Internet. The idea of remote controlling TM-D710 is simple; it's just to extend the cord between the radio and the control panel using Internet. When you press the power button on the panel the radio comes to life at the remote side and sound and panel info flows across the Internet between the pair of RRC-1258MkII:s. The look and feel of the panel is the same as if the panel was directly connected to the radio.

Hardware configuration

It's very simple to Interface the TM-D710 for remote control via the RRC:s. You only need to make two simple cables. One from the Control panel to the Control-RRC and one from the Radio-RRC to the Radio. The standard mic (MC-59) provided with the TM-D710 can be used and connected directly to the Control-RRC. From Radio-RRC to Radio a standard CAT-5 cable can be used for the Mic-signals. A standard audio cable with 1/8" inch connectors are used for the audio. A speaker are also needed as there is no speaker in the Control panel.

All software settings are the same as for TS-480, but the straps are a little bit different in the Control-RRC as the MC-59 mic needs 8V DC feeding. (see drawings below).

Remember that the buttons on the microphone will not work. If you need DTMF use an other Mic with built in DTMF encoder. The MC-59 do not have it. It's also possible to program DTMF functions to the radio which will available from the Control panel. All other functions works as in the normal setup.

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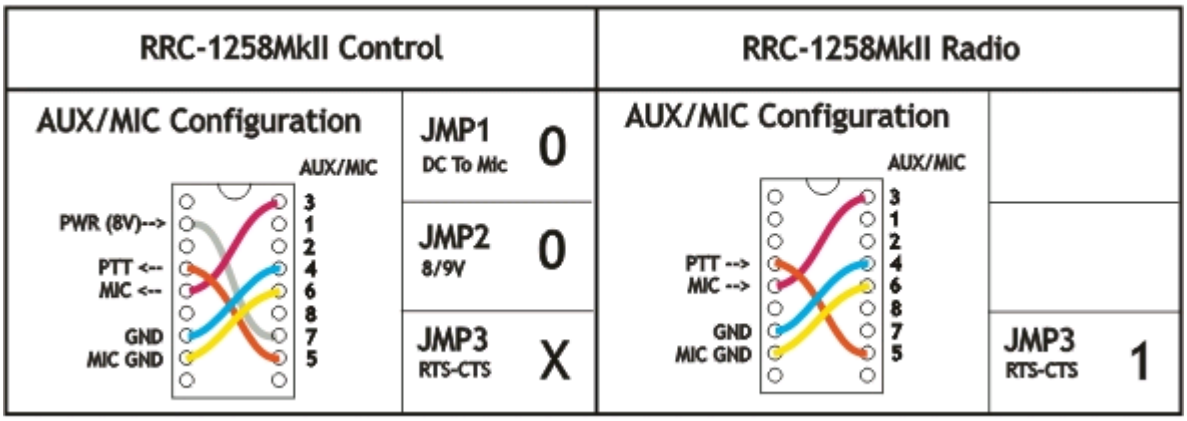
Kenwood TM-D710



1 = In place, 0 = Not in place, X = doesn't matter

Radio settings (example)

Parameter	Control	Radio
Program mode	5 – TS480/TM-D710	5 – TS480/TM-D710
SIP password	hello	hello
SIP realm		
SIP contact	192.168.0.228	
Auto connect	No	
Audio quality	2 – Linear 16 bits 8 kHz	2 – Linear 16 bits 8 kHz
Audio dual-rx (*)		No
Codec out gain	255	255
Codec inp gain	13	0
Codec inp preamp	Yes	
Codec HPF Hz	163	163
COM0 baudrate	57600	57600
COM0 data bits	8	8
COM0 stop bits	1	1
COM0 parity	0 - Off	0 - Off

*) Available only in RRC-1258MkIIs.

Power supply

Control-RRC:

The Control-RRC is supplied with a common 13,8 V (10-18V) power supply. The display and speaker amplifier needs a lot of power so you need at least 1A.

Radio-RRC:

The Radio-RRC could be powered with a separate Power supply or the same as the radio. If you use the Radio PS make sure you have a 1A fuse on the output to the RRC. Do not connect it direct to a 20-40A PS the cable will melt if something happens.

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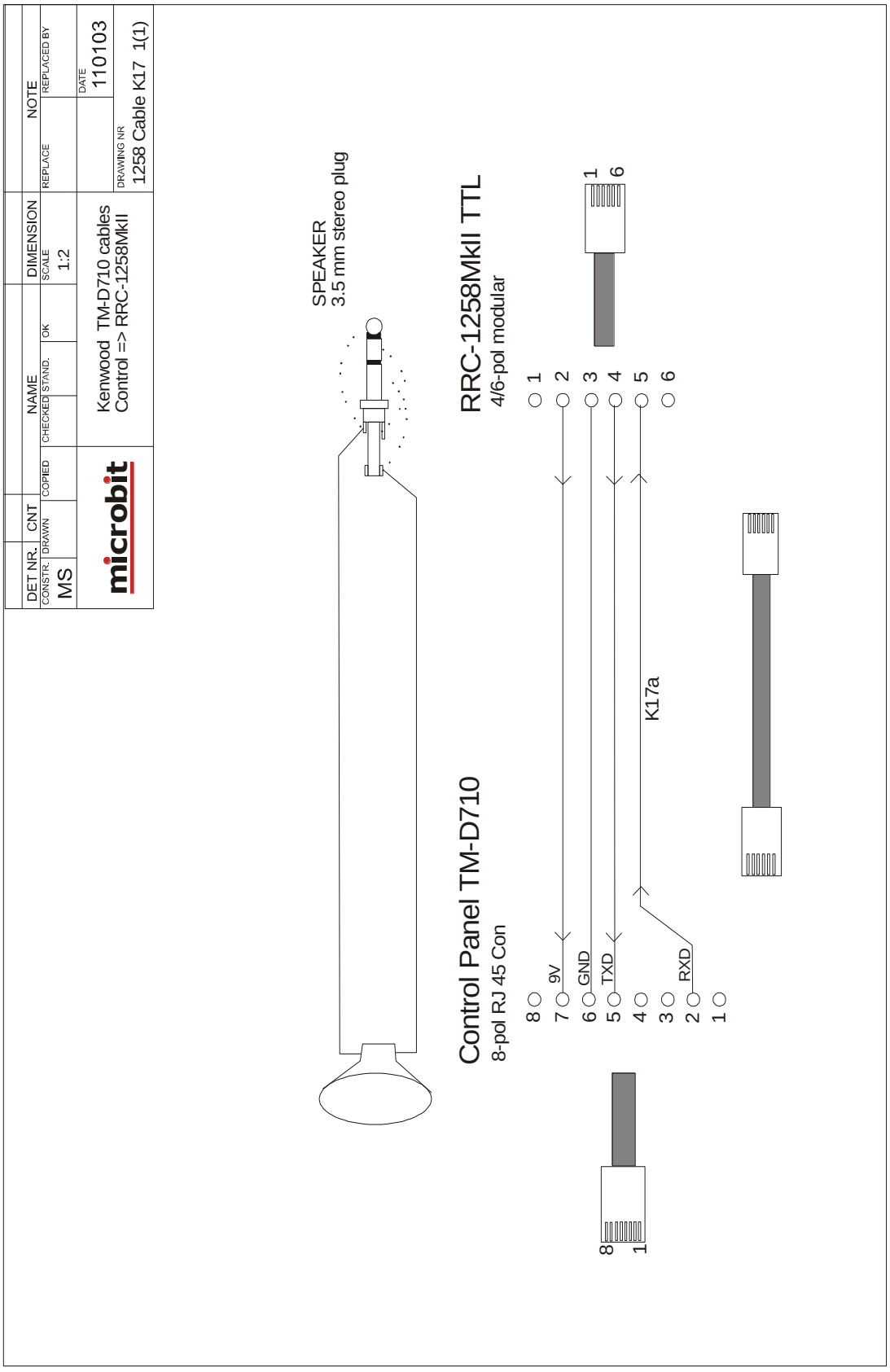

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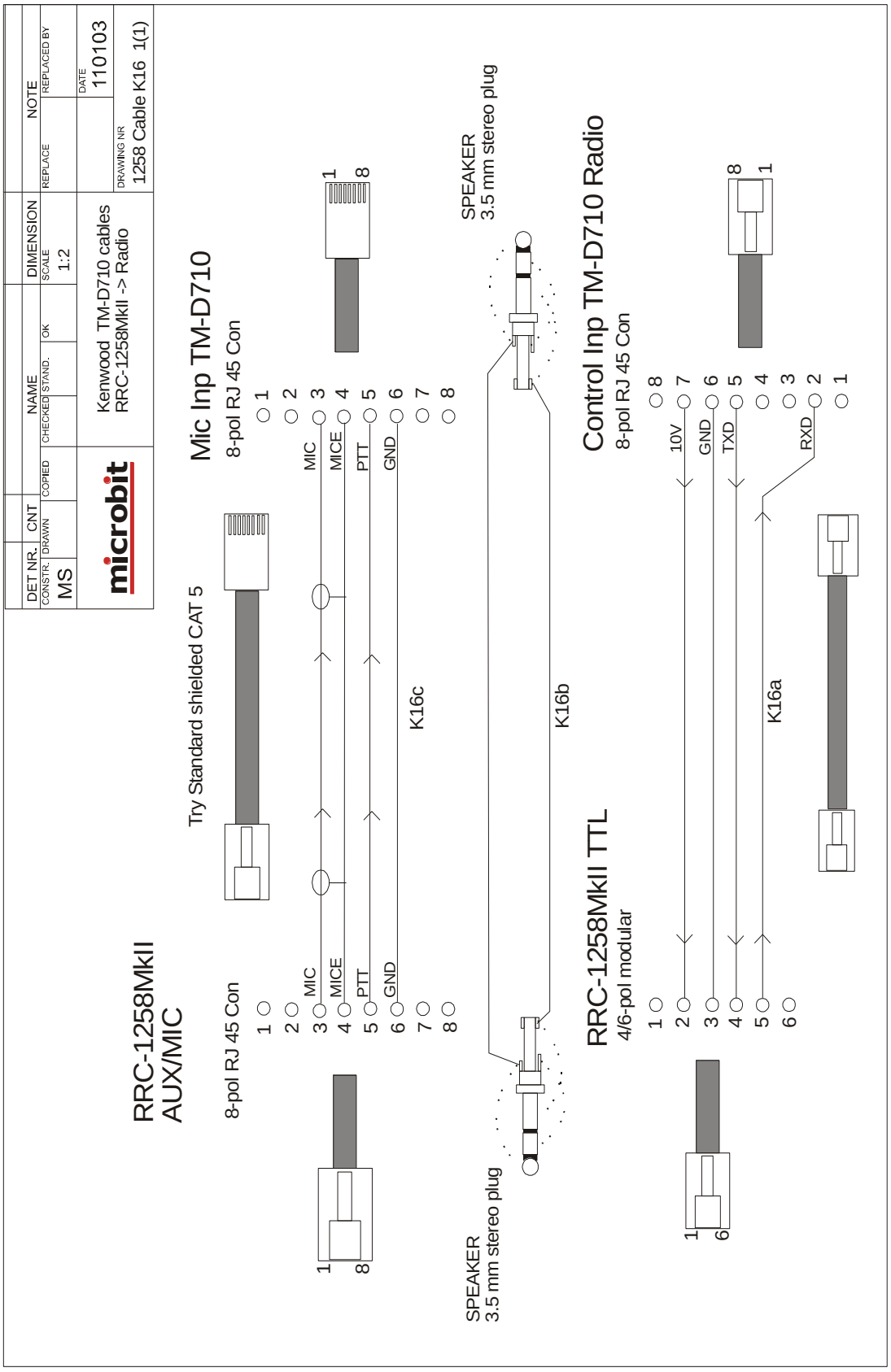

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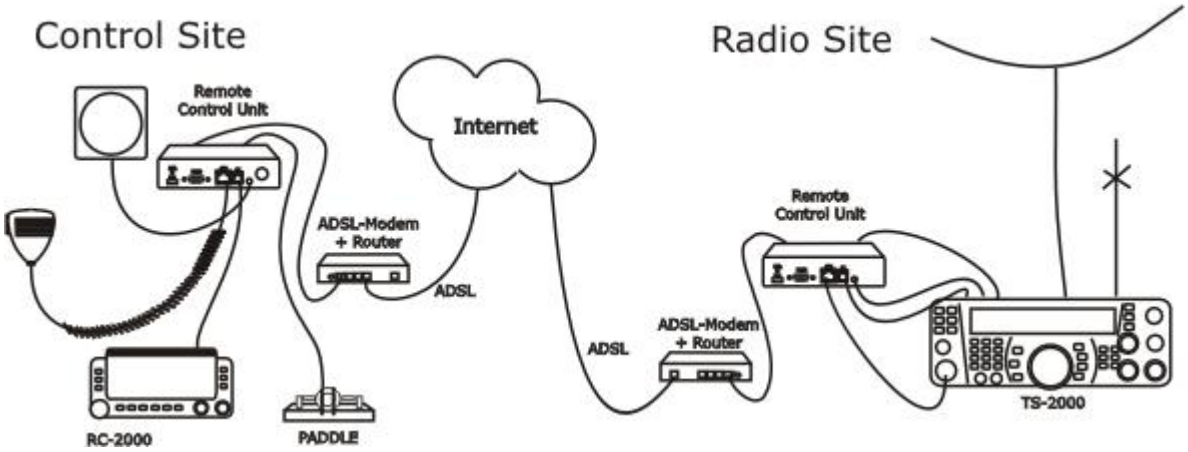
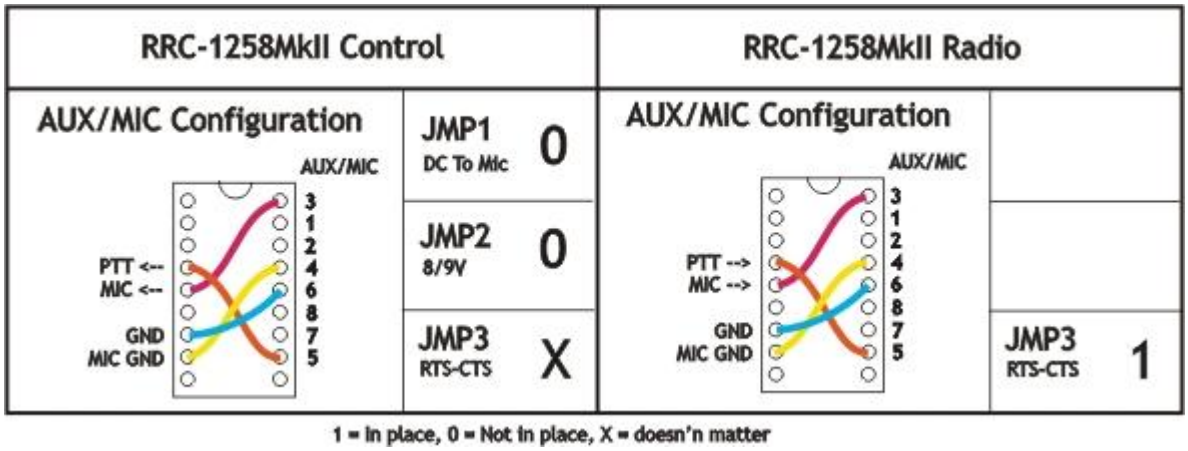
KENWOOD TS-2000

General



The technical solution for TS-2000 is the same as for TS-480 and IC-706 with the different that TS-2000 has a special control panel witch works in parallel with the front panel control on the radio. If you have the TS-2000 at your summer QTH you do not need to take the control panel with you when you want to use the TS-2000 locally. We replace the cable between panel and radio with to RRC-1258, one connected to the control panel and one connected to the radio. When you press the power button on the panel the radio comes to life at the remote side and audio and panel info flows across the internet between the RRC:s. The look and feel of the control panel is the same as if the panel was directly connected to the radio.

Hardware configuration



1 = in place, 0 = Not in place, X = doesn't matter

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Radio settings (example)

Parameter	Control	Radio
Program mode	8 – TS2000	8 – TS2000
SIP password	hello	hello
SIP realm		
SIP contact	192.168.0.228	
Auto connect	No	
Audio quality	2 – Linear 16 bits 8 kHz	2 – Linear 16 bits 8 kHz
Audio dual-rx (*)	-	Yes
Codec out gain	255	255
Codec inp gain	13	0
Codec inp preamp	Yes	
Codec inp HPF Hz	163	163
COM0 baudrate	57600	57600
COM0 data bits	8	8
COM0 stop bits	1	1
COM0 parity	0 - Off	0 - Off

(*) Available only in RRC-1258MkIIs, remember that the bandwidth demand is doubled.

Connections

The TS-2000 is quite simple to connect because you do not need any special cable. All necessary signals between the panel and the radio are connected with the 4 wires in the connection cable. We just need to cut it apart and connect a RRC-1258MkII in each end. The following signals are represented in the connection cable (modular):

RJ12 Modular 4/6 Radio	RJxx Modular 4/4 Control panel	Description
1		
2	1	8V power to control panel (always present)
3	2	GND
4	3	RDO - serial data 57600 bps from radio to panel
5	4	TDO - serial data 57600 bps from panel to radio
6		

The easiest way to make these two cables from control panel to Control-RRC TTL connector and from Radio-RRC TTL connector to radio is to cut the cable supplied by Kenwood into two pieces. You only have to crimp two new 4/6 modular connectors on the cables. Don't make the one between Radio-RRC and radio to long.

The long microphone extension cable supplied by Kenwood can also be used between Radio-RRC AUX/MIC connector to the radio Microphone jack. Probably you need to cut it later to prevent it from picking up HF from your antennas.

The microphone can be connected to the Control-RRC AUX/MIC connector using the adapter cable MJ-88 supplied by Kenwood with your TS-2000.

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The speaker supplied with the TS-2000 is connected to the 3.5 mm SP-jack on the front of the Control-RRC.

The speaker signal from the TS-2000 ext. speaker jack to the Radio-RRC SP jack is connected via a standard "off-the-shelf" cable with 3.5 mm stereo plugs in both ends.

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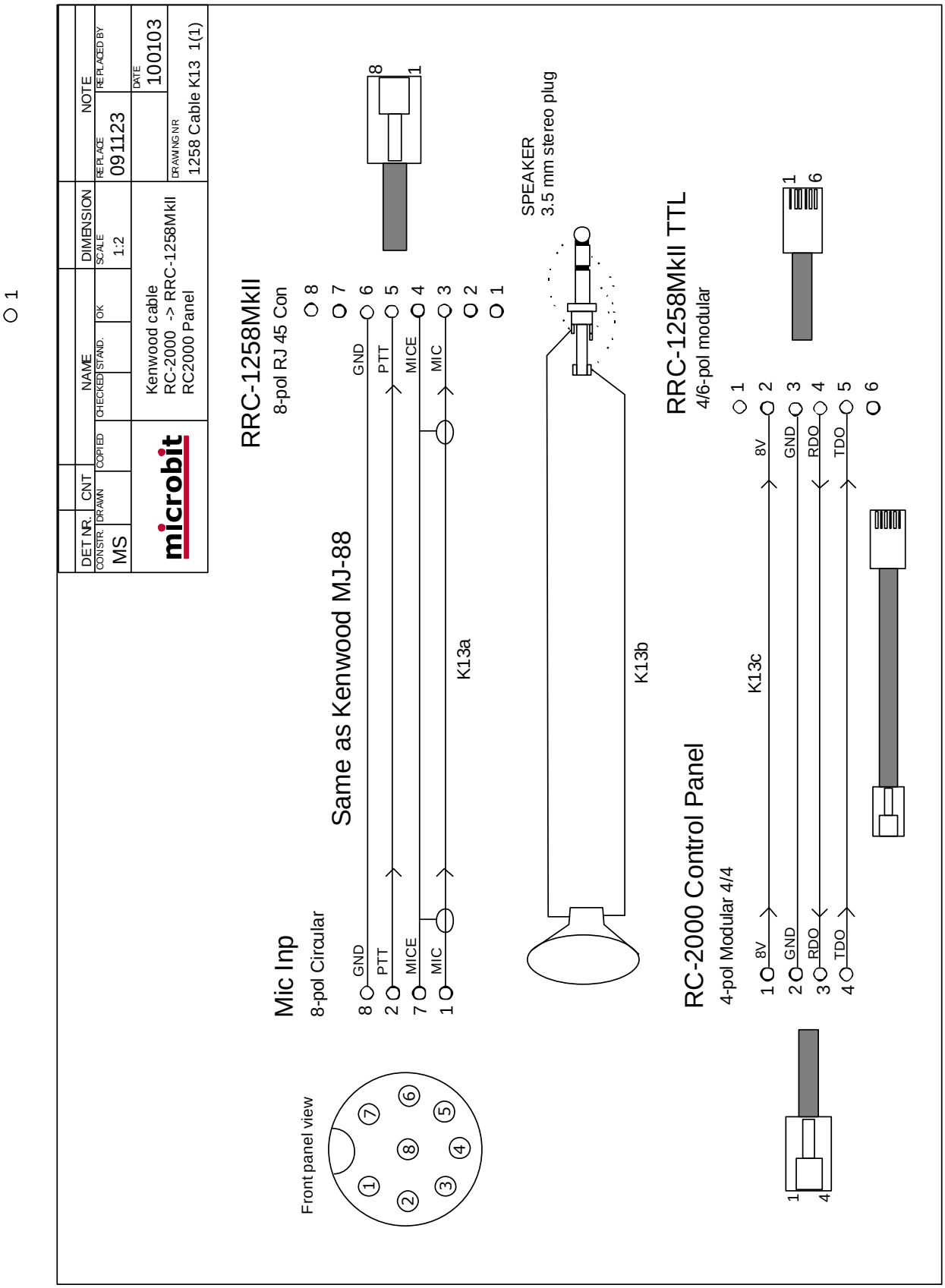

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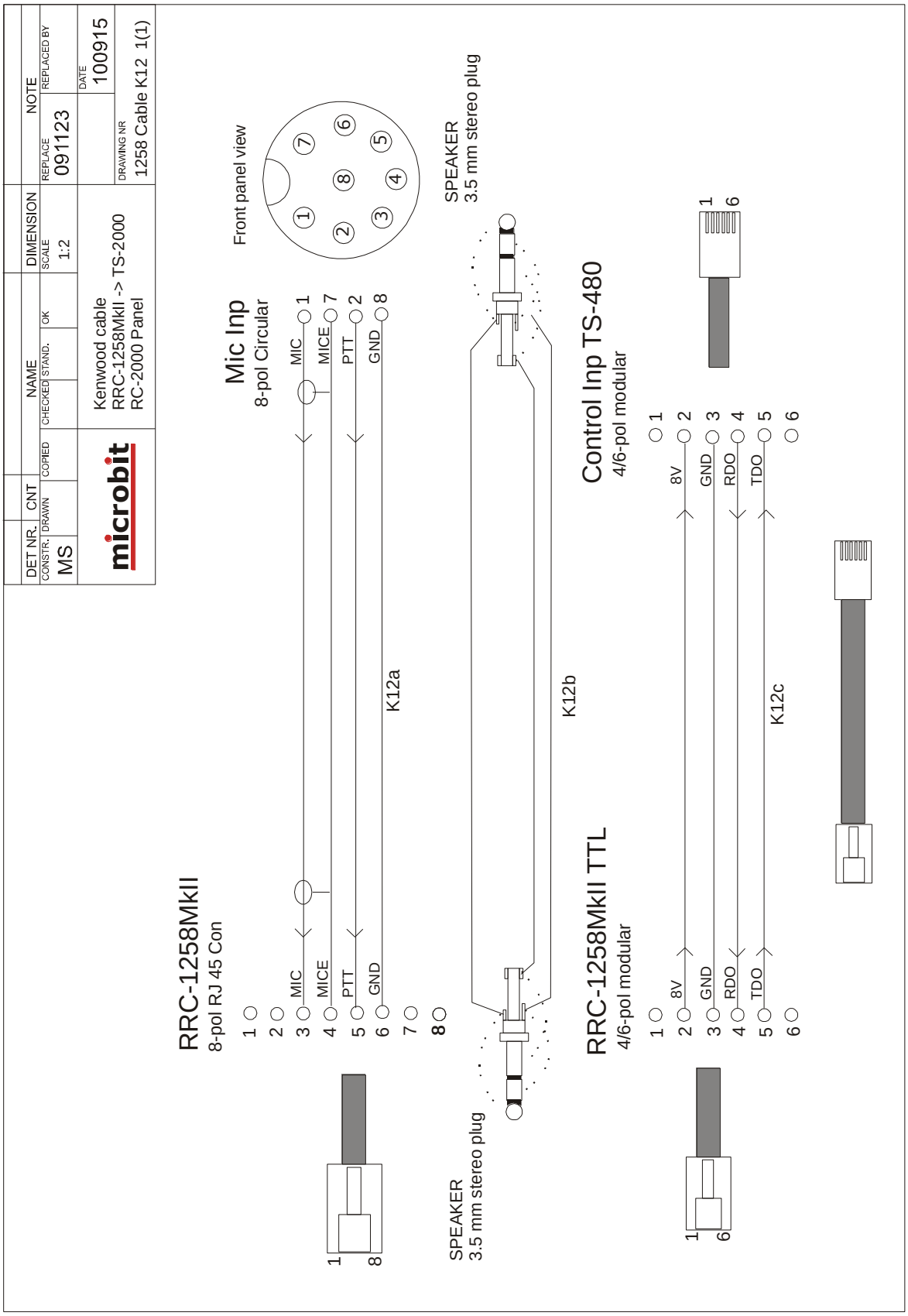

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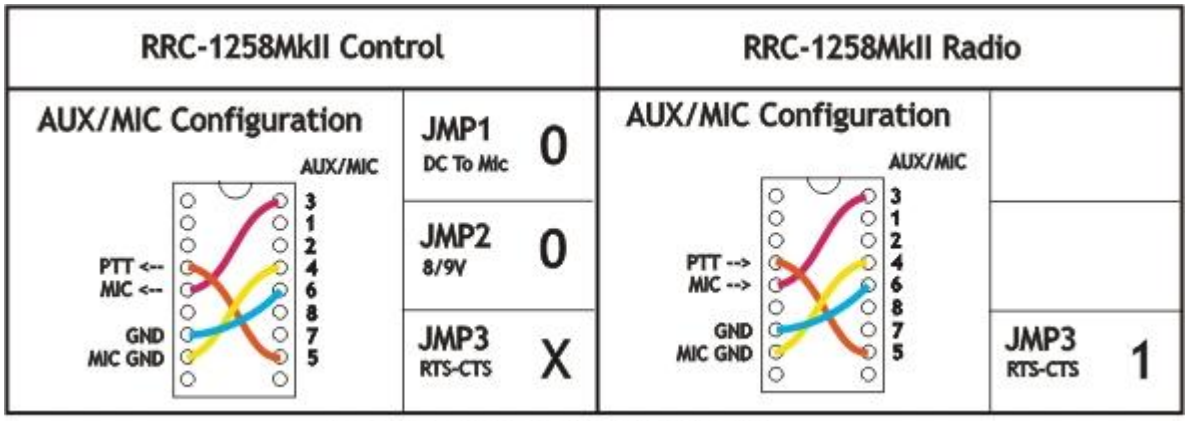
ELECRAFT

General

Field reports from users of the remoterig system say that the system works with both Elecraft K2 and K3.

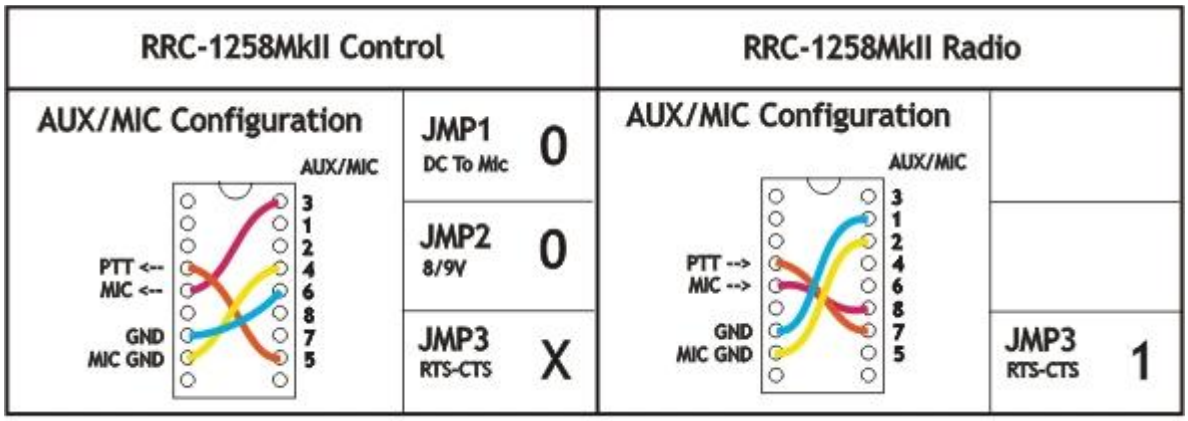
Hardware configuration

Normal (if the microphone needs a bias voltage put JMP1 in place):



1 = In place, 0 = Not in place, X = doesn'n matter

With SLCAB8R adapter cable:



1 = In place, 0 = Not in place, X = doesn'n matter

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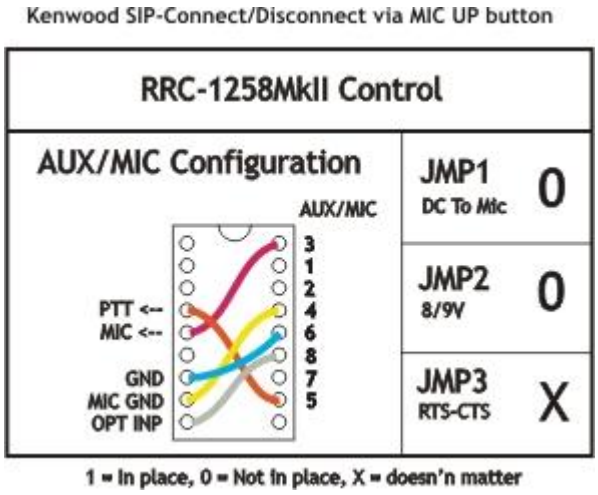
SIP-Connect/disconnect via MIC UP button:



Radio settings (example)

Parameter	Control	Radio
Program mode	4 – Yaesu, Kenwood, Elecraft	4 – Yaesu, Kenwood, Elecraft
SIP password	hello	hello
SIP realm		
SIP contact	192.168.0.228	
Auto connect	No	
Audio quality	2 – Linear 16 bits 8 kHz	2 – Linear 16 bits 8 kHz
Audio Dual-RX	-	Yes/No
Codec out gain	255	255
Codec inp gain	18	0
Codec inp preamp	Yes	
Codec inp HPF Hz	163	163
COM0 baudrate	9600	9600
COM0 data bits	8	8
COM0 stop bits	1	1
COM0 parity	0 - Off	0 - Off

(*) Available only in RRC-1258MkIIs, remember that the bandwidth demand is doubled.

Connections

Control-RRC:

- Connect a standard RS-232 cable between the PC and the RRC COM2.
- The microphone can be connected direct to the RRC AUX/MIC connector if you have a microphone with RJ-45 connector. If you have a microphone with a circular connector you can buy an adapter cable, MJ-88, from Kenwood or make one by yourself.
- The speaker is connected direct to the RRC SP-jack with a 3.5 mm stereo plug.

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Radio-RRC:

- From the RRC COM2 connector to the radios KIO3 module connector (D-sub RS-232) you use a standard RS-232 cable.
- Between the RRC AUX/MIC connector and the radios circular microphone jack you need to make an adapter cable by yourself or buy one from e.g. a Tigertronics distributor (for Signallink), its article number is SLCAB8R. If you use Tigertronic cable you need to put the straps different. If you make the cable by yourself, just cut a standard FTP (screened) patch cable and solder an 8-pin circular connector on it. Make the cable as short as possible to prevent it from picking up HF.
- The speaker signal from the radios external speaker jack to the RRC SP jack is connected via a standard "off- the-shelf" cable with 3.5 mm stereo plugs in both ends.

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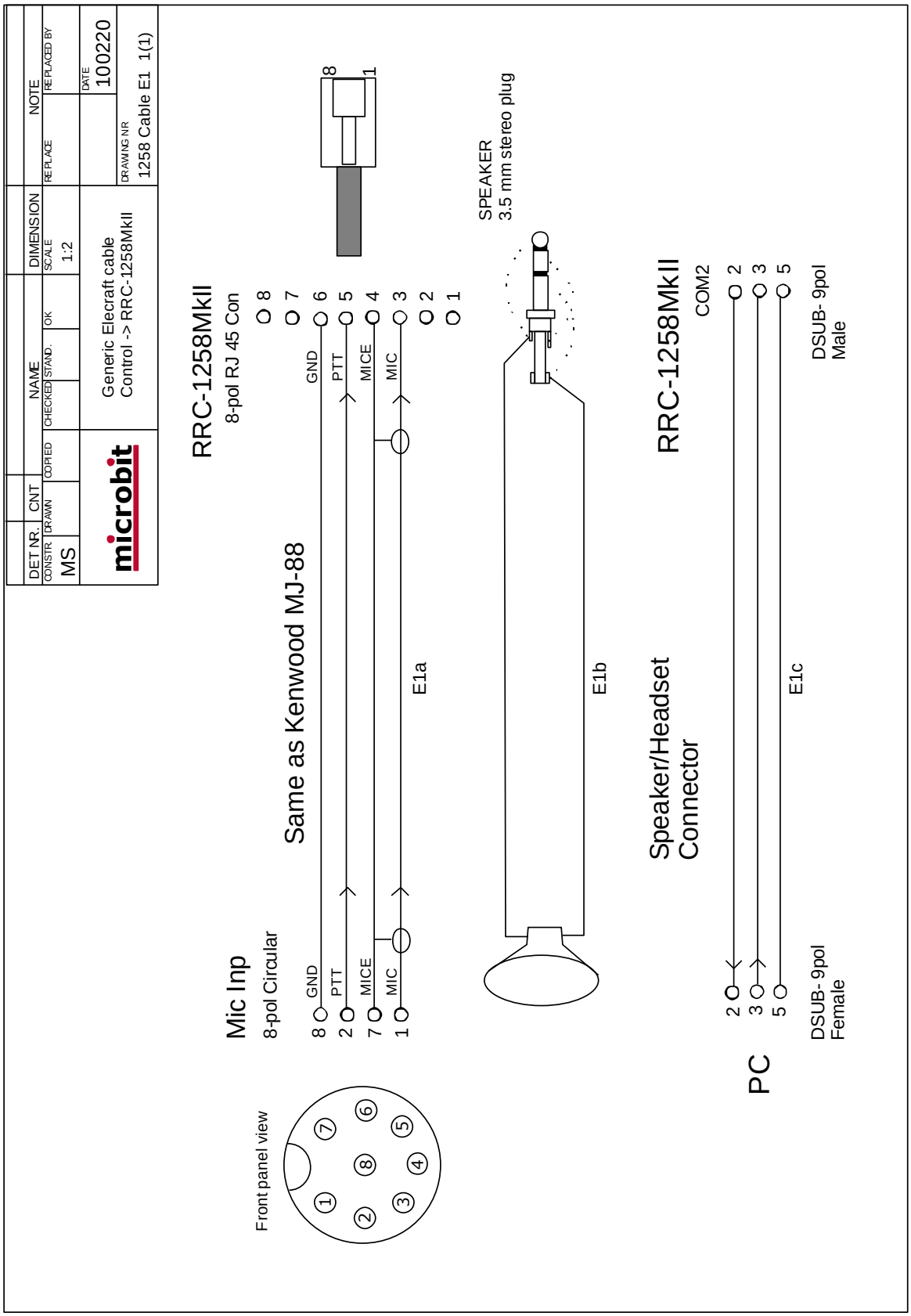

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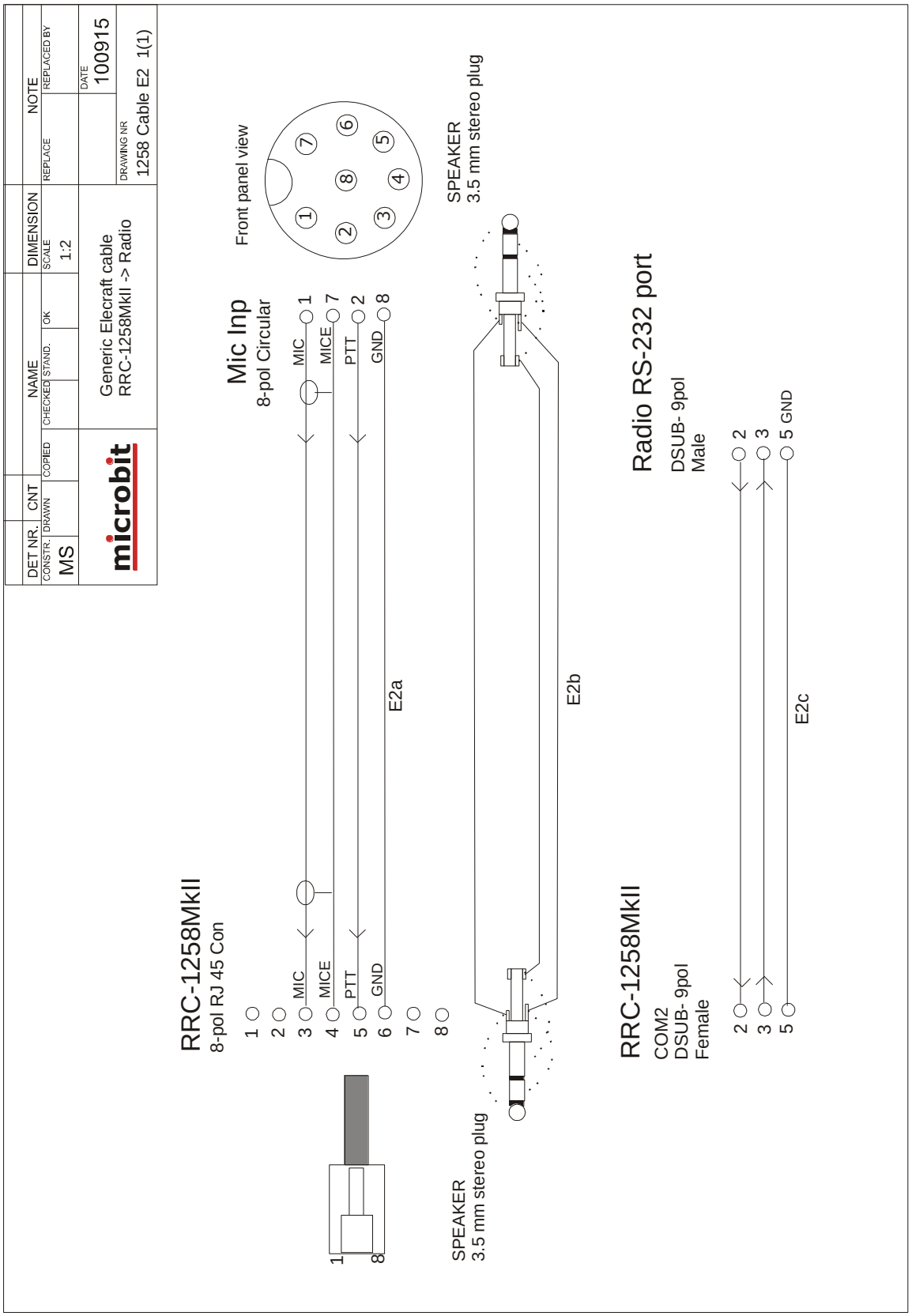

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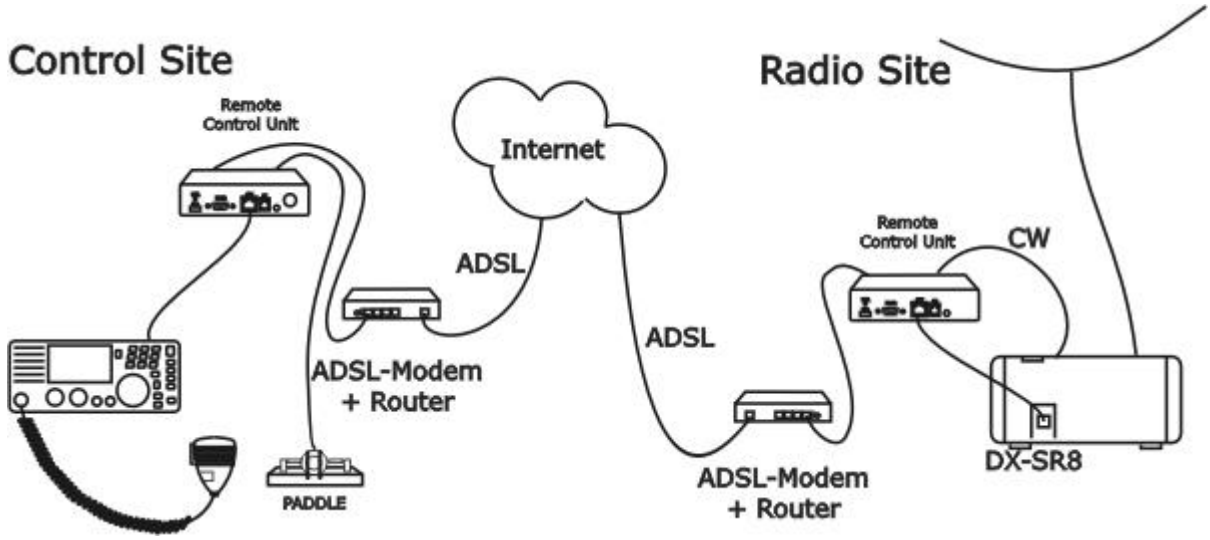
ALINCO DX-SR8 and DX-R8

General



The technical solution for the transceiver Alinco DX-SR8 and the receiver DX-R8 is the same as for IC-703/706, TS480 and TS-2000. All those transceivers are built in the way that the control panel is working separated from the radio unit itself. We replace the cable between panel and radio with to RRC-1258, one connected to the control panel and one connected to the radio. When you press the power button on the panel the radio comes to life at the remote side and audio and panel info flows across the internet between the RRC:s. The look and feel of the control panel is the same as if the panel was directly connected to the radio.

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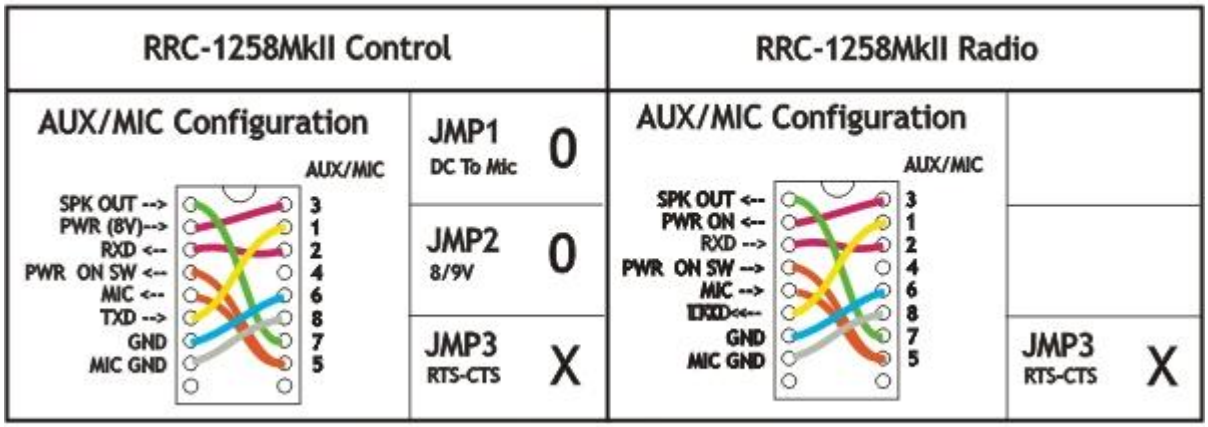
Hardware configuration

DX-SR8



1 = In place, 0 = Not in place, X = doesn't matter

Radio settings (example)

Parameter	Control	Radio
Program mode	12 – DX-SR8	12 – DX-SR8
SIP password	hello	hello
SIP realm		
SIP contact	192.168.0.228	
Auto connect	No	
Audio quality	2 – Linear 16 bits 8 kHz	2 – Linear 16 bits 8 kHz
Audio dual-rx (*)		No
Codec out gain	255	255
Codec inp gain	12	0
Codec inp preamp	Yes	
Codec inp HPF Hz	163	163
COM0 baudrate	38400	38400
COM0 data bits	8	8
COM0 stop bits	1	1
COM0 parity	0 - Off	0 - Off

(*) Available only in RRC-1258MkIIs.

Connections

All necessary signals between the panel and the radio are connected with the 8 wires in the connection cable, a standard patch cable. We just need to use two standard patch cables, one between the control panel and the Control-RRC and the other one between the Radio-RRC and the radio. Convenient for travelling is that the speaker is already present on the back of the control panel so there is no need for an extra speaker even if a bigger separate speaker gives better audio. The following signals are represented in the connection cable:

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1	TXD - data from radio to control panel
2	RXD - data from Control panel to radio
3	8V - power to control panel (when radio is switched on)
4	Not in use
5	Mic signal / PWR on/off button
6	GND
7	AF - Audio to speaker.
8	SPK GND - Speaker ground

Power supply

Control-RRC:

The Control-RRC is supplied with a common 13.8 V (10-18V) power supply. The display and speaker amplifier needs a lot of power so you need at least 1A.

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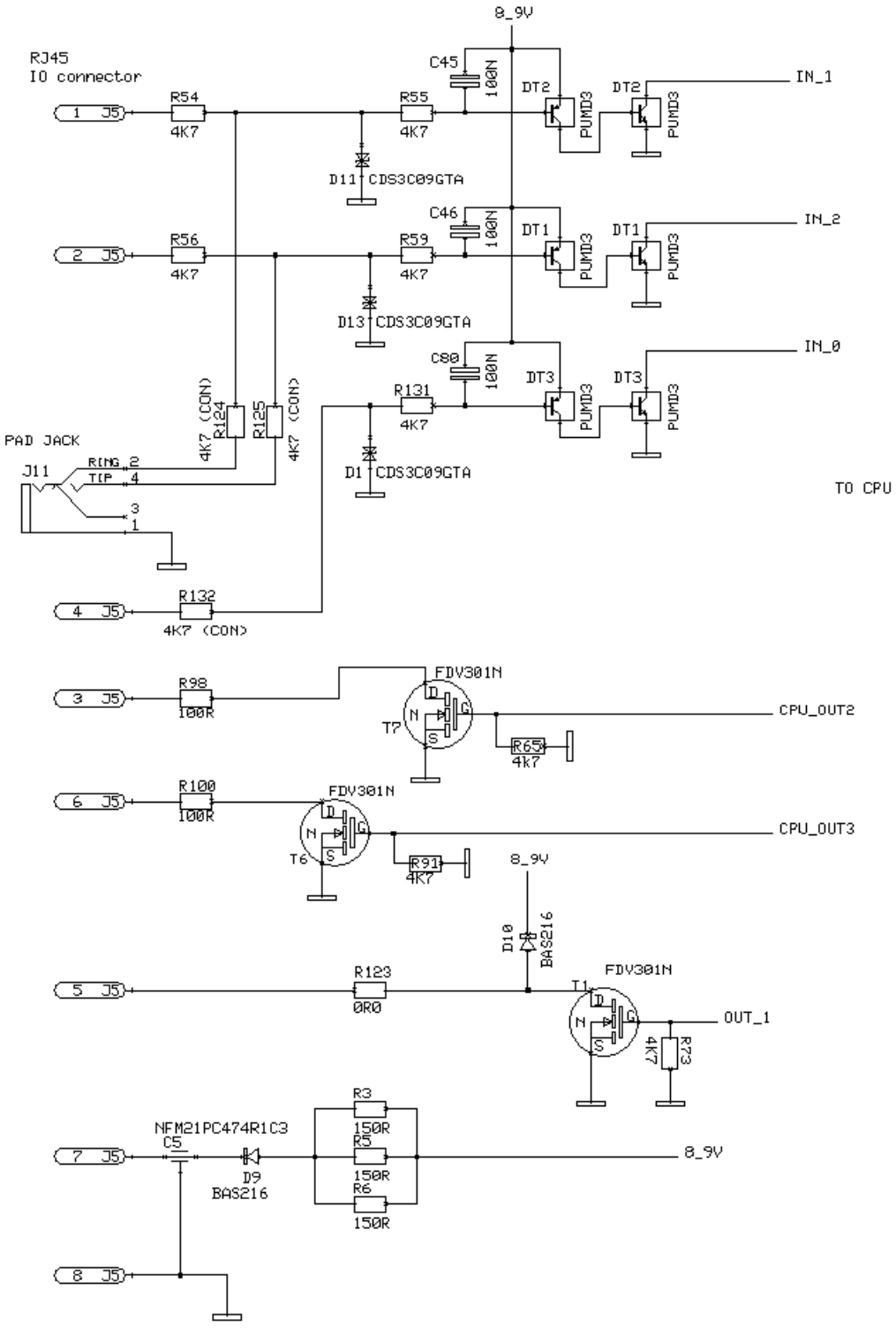
Schematics

I/O and PAD Interface Control-RRC



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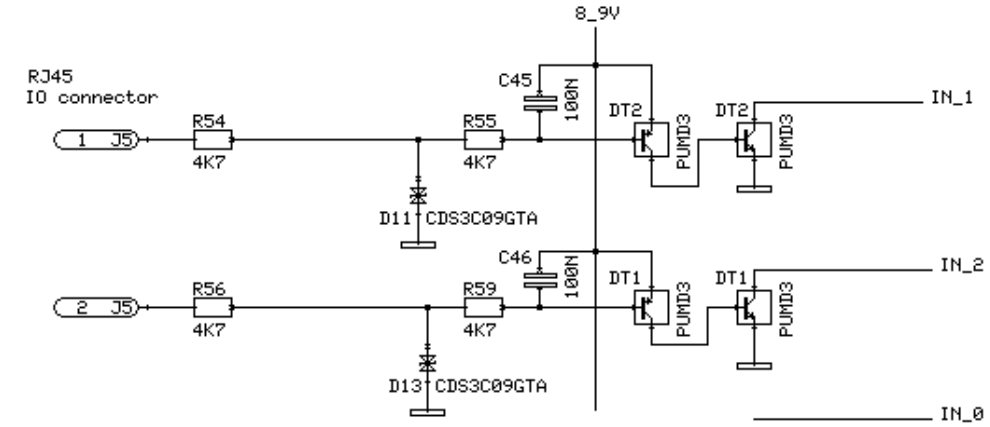
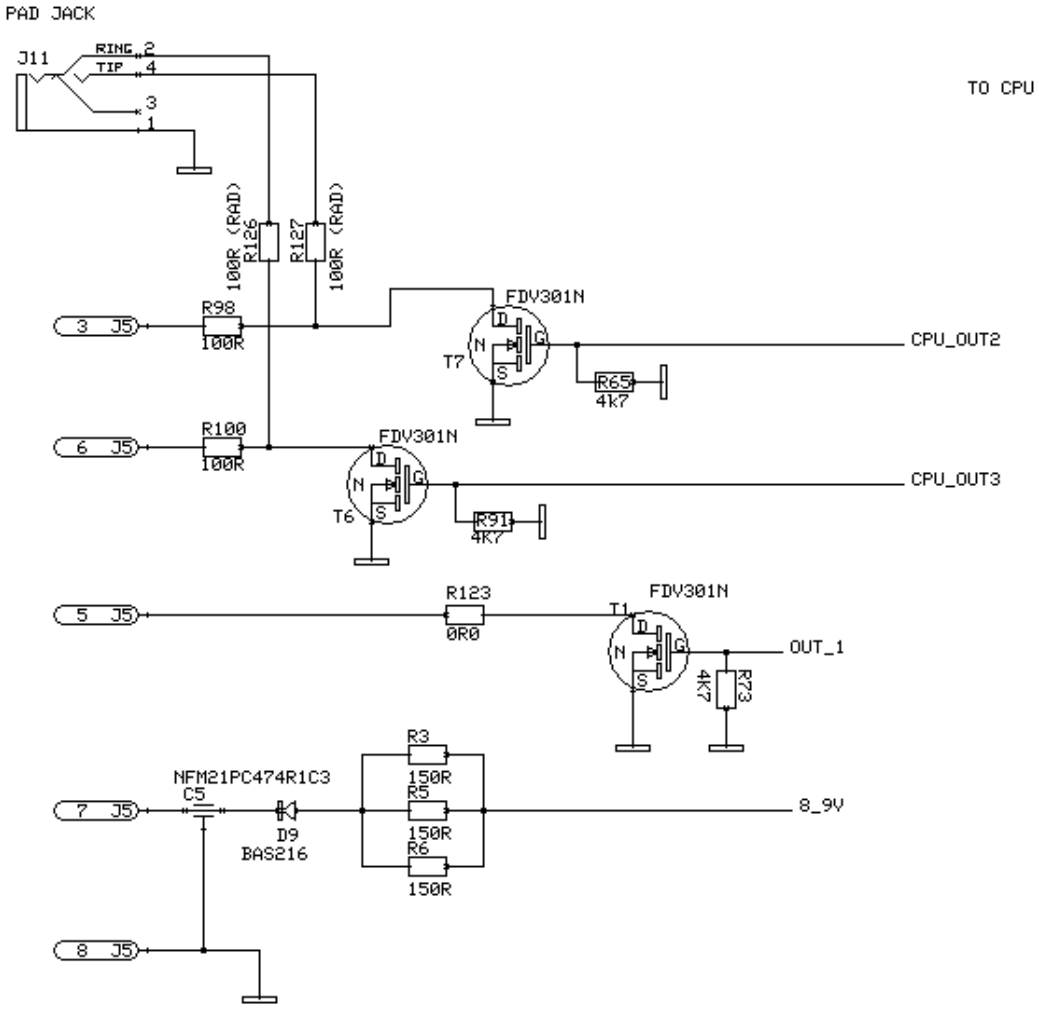
I/O and PAD Interface Radio-RRC





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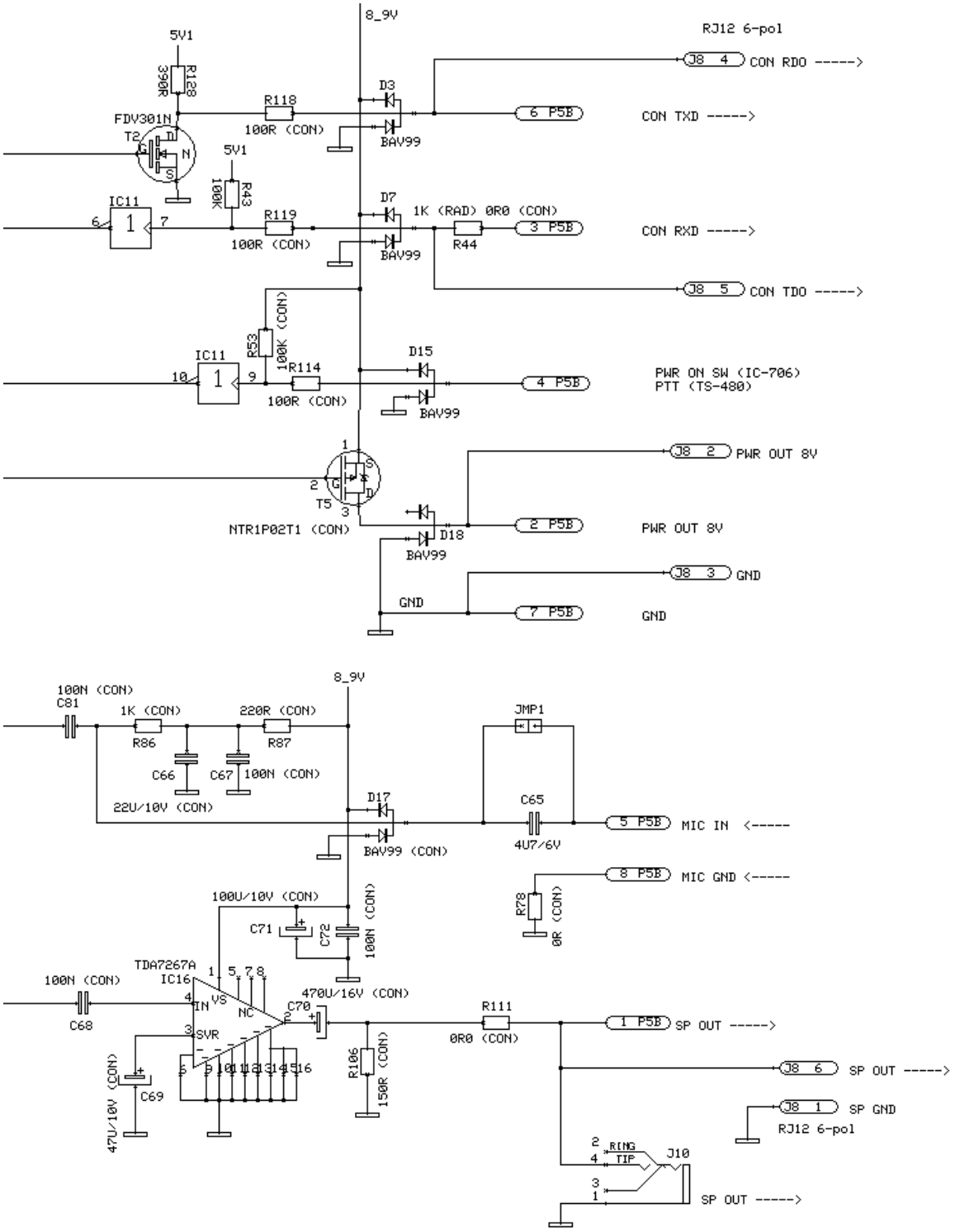
MIC/AUX Interface Control-RRC



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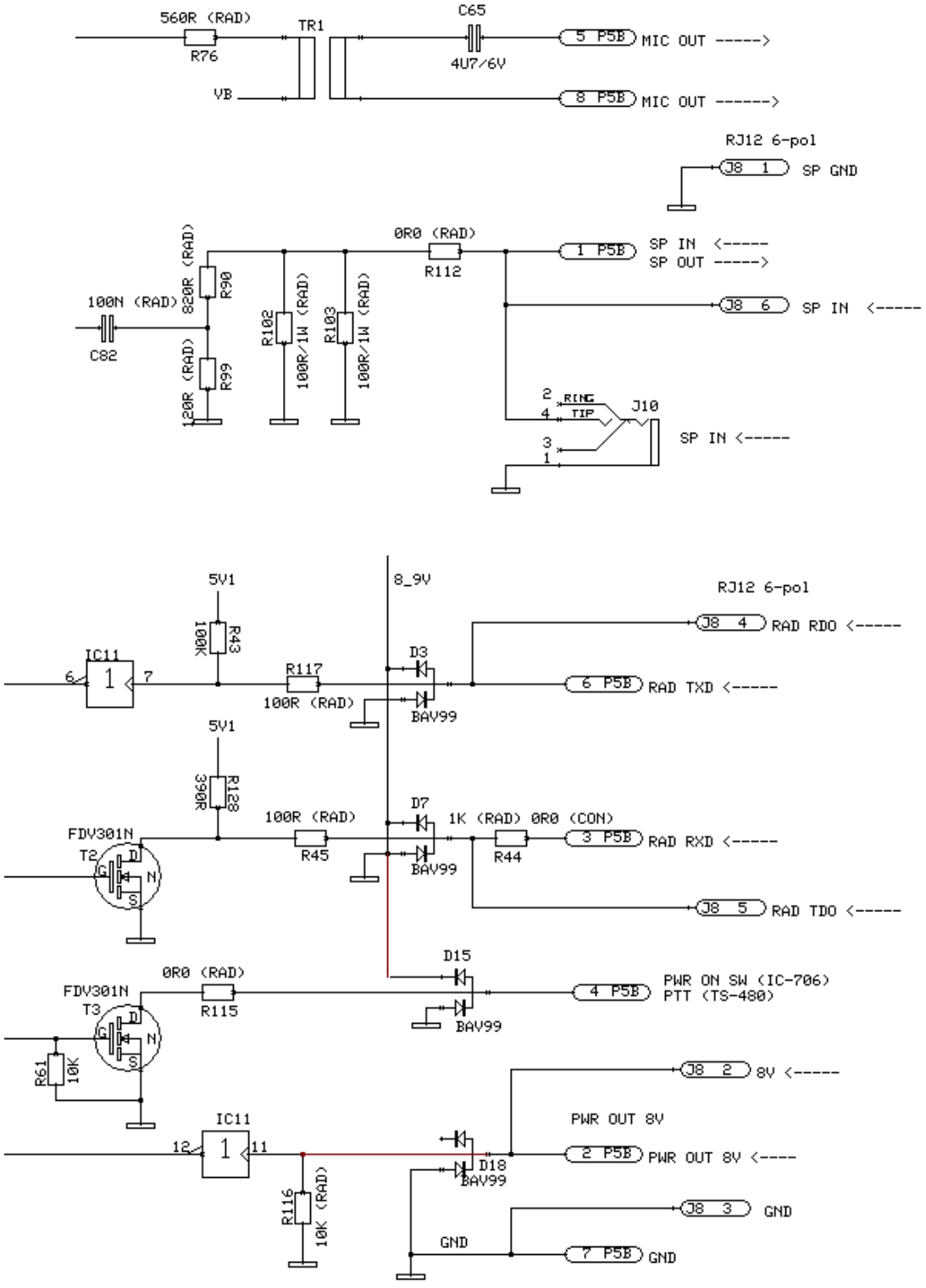
MIC/AUX Interface Radio-RRC



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Network and Firewalls

One of the major obstacles when trying to remotely control something is the fact that the Internet Service Provider (ISP) forces us to use dynamic IP addresses. We can never know, from time to time, which IP address our modem / firewall / router has on its outside interface (the IP address you will try to connect to). Most people use NAT routers that translates IP addresses on the inside (your little LAN) to one common IP address on the outside using port conversion.

To be able to stream audio and at the same time transfer CAT / CI-V commands or panel-to-radio communications' we need to know which IP port numbers are used for each service. There are some different techniques to fix this.

At the operator end (Control-RRC) there is normally OK just to use DHCP for the own IP-settings. For the Sip contact parameter you enter the public fixed IP address or DynDNS-name to the router at the radio site.

At the radio end (Radio-RRC) the router must be configured so that port 5060, 11000 and 12000 (default settings) is directed to the Radio-RRC which should have a static IP address. The easy way to get connected is to set the RRC IP address as DMZ server in the router. This makes it possible to connect to all services (SIP, audio and control) as well as the web and telnet interfaces without further configuration. If you are using SIP based IP telephony you need to change the port SIP port from 5060 to an other port not used by the IP-telephony service in both RRC:s. If you run a web server at the radio site you need to change the webserver port from 80 to something else, for example 8000. If you are using port forwarding you have to configure the router in a way that every service forwards packets to the right host on the inside.

When setting up the router check that there is No SIP ALG activated.

You will also need to register the Radio-RRC to DynDNS (www.dyndns.com) so you can use a host name to connect to the Radio-RRC regardless of its dynamic IP address (which can change without notice, but rarely does).

The following default IP ports are used (changeable)

port number	function
5060	SIP (change this port number in both ends if you are using SIP based IP-telephony)
11000	RTP, audio
12000	DATA channel, control commands
80	WEB interface
23	Telnet Interface

SIP, RTP and DATA protocols are UDP-based, WEB and Telnet are TCP-based.

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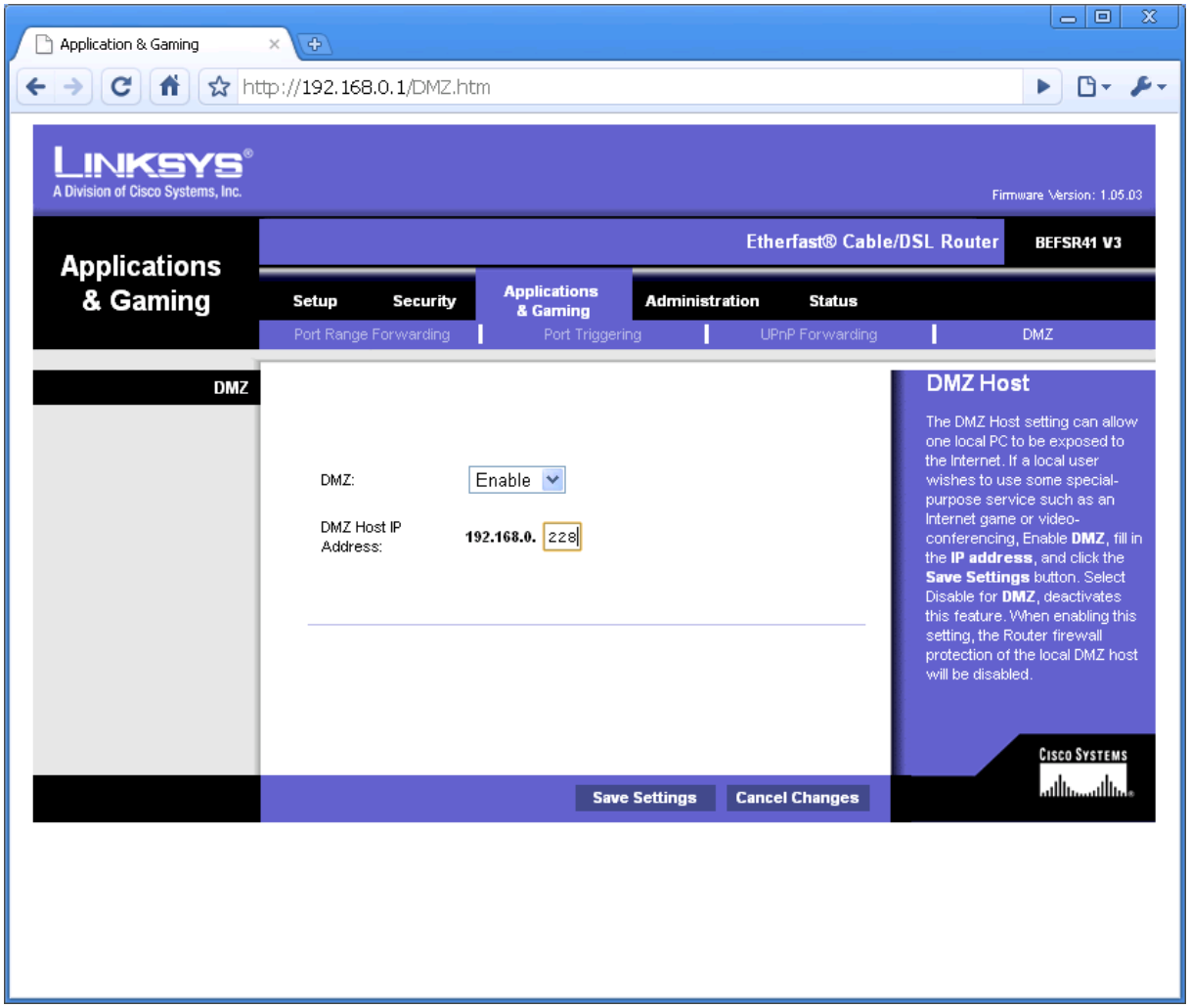
DMZ

A typical setup screen for activating DMZ is shown below.

Enter the IP-number of the Radio-RRC in box and enable DMZ.


Application & Gaming
http://192.168.0.1/DMZ.htm
LINKSYS
A Division of Cisco Systems, Inc.
Firmware Version: 1.05.03
Applications & Gaming
Etherfast® Cable/DSL Router
BEFSR41 V3
Setup
Security
Applications & Gaming
Administration
Status
Port Range Forwarding
Port Triggering
UPnP Forwarding
DMZ
DMZ
DMZ:
Enable
DMZ Host IP Address:
192.168.0.
228
DMZ Host
The DMZ Host setting can allow one local PC to be exposed to the Internet. If a local user wishes to use some special-purpose service such as an Internet game or video-conferencing, Enable DMZ, fill in the IP address, and click the Save Settings button. Select Disable for DMZ, deactivates this feature. When enabling this setting, the Router firewall protection of the local DMZ host will be disabled.
Cisco Systems
Save Settings
Cancel Changes

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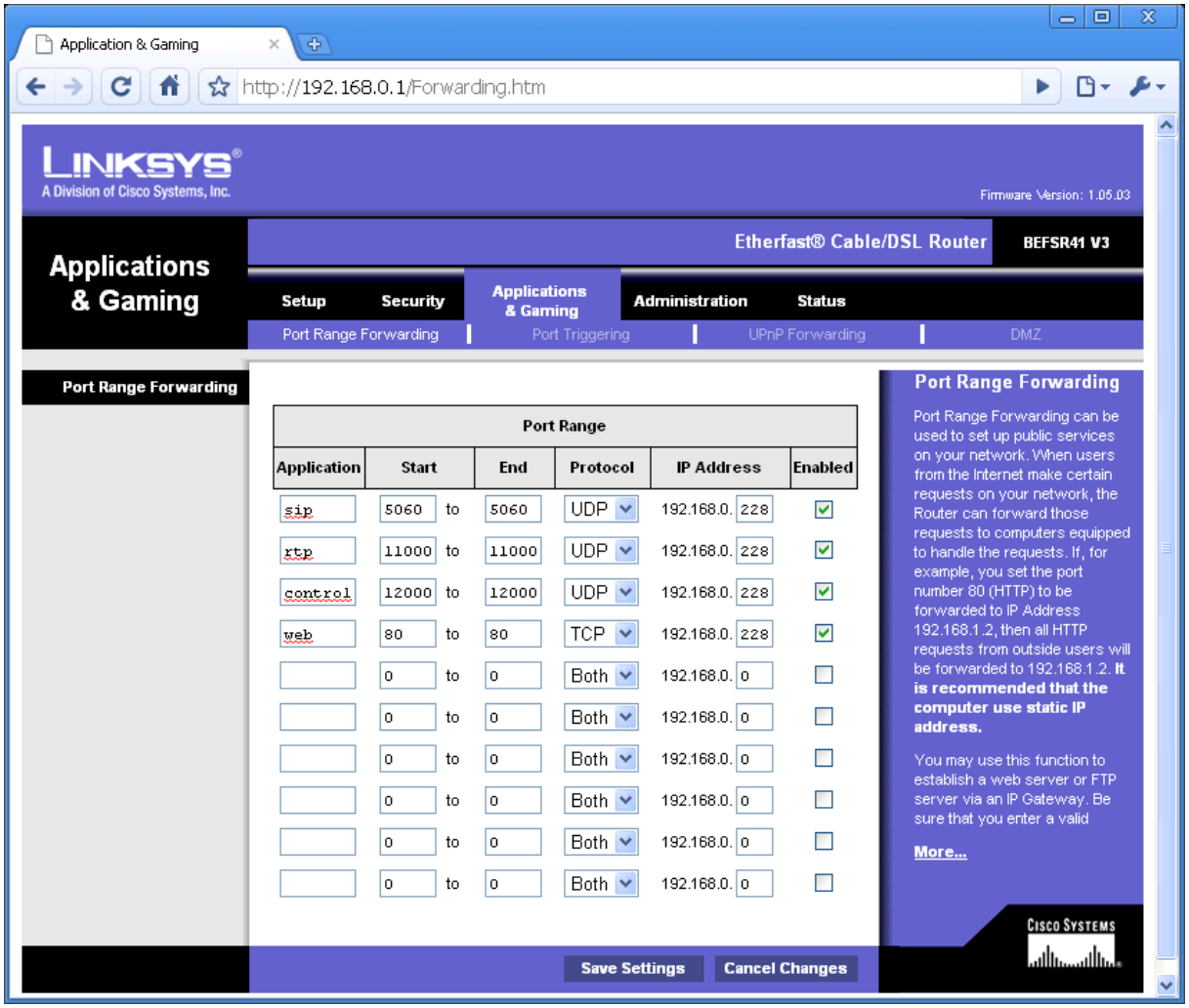
Portforwarding

A typical setup screen for activating port forwarding is shown below.

There is one row assigned for each port (service) all refereeing to the IP of the Radio-RRC


Application & Gaming
http://192.168.0.1/Forwarding.htm
LINKSYS
A Division of Cisco Systems, Inc.
Firmware Version: 1.05.03
Applications & Gaming
Etherfast® Cable/DSL Router
BEFSR41 V3
Setup
Security
Applications & Gaming
Administration
Status
Port Range Forwarding
Port Triggering
UPnP Forwarding
DMZ
Port Range Forwarding
Port Range
Application
Start
End
Protocol
IP Address
Enabled
sip 5060 to 5060 UDP 192.168.0. 228
rtp 11000 to 11000 UDP 192.168.0. 228
control 12000 to 12000 UDP 192.168.0. 228
web 80 to 80 TCP 192.168.0. 228
0 to 0 Both 192.168.0. 0
Port Range Forwarding
Port Range Forwarding can be used to set up public services on your network. When users from the Internet make certain requests on your network, the Router can forward those requests to computers equipped to handle the requests. If, for example, you set the port number 80 (HTTP) to be forwarded to IP Address 192.168.1.2, then all HTTP requests from outside users will be forwarded to 192.168.1.2. It is recommended that the computer use static IP address.
You may use this function to establish a web server or FTP server via an IP Gateway. Be sure that you enter a valid
More...
Cisco Systems
Save Settings
Cancel Changes

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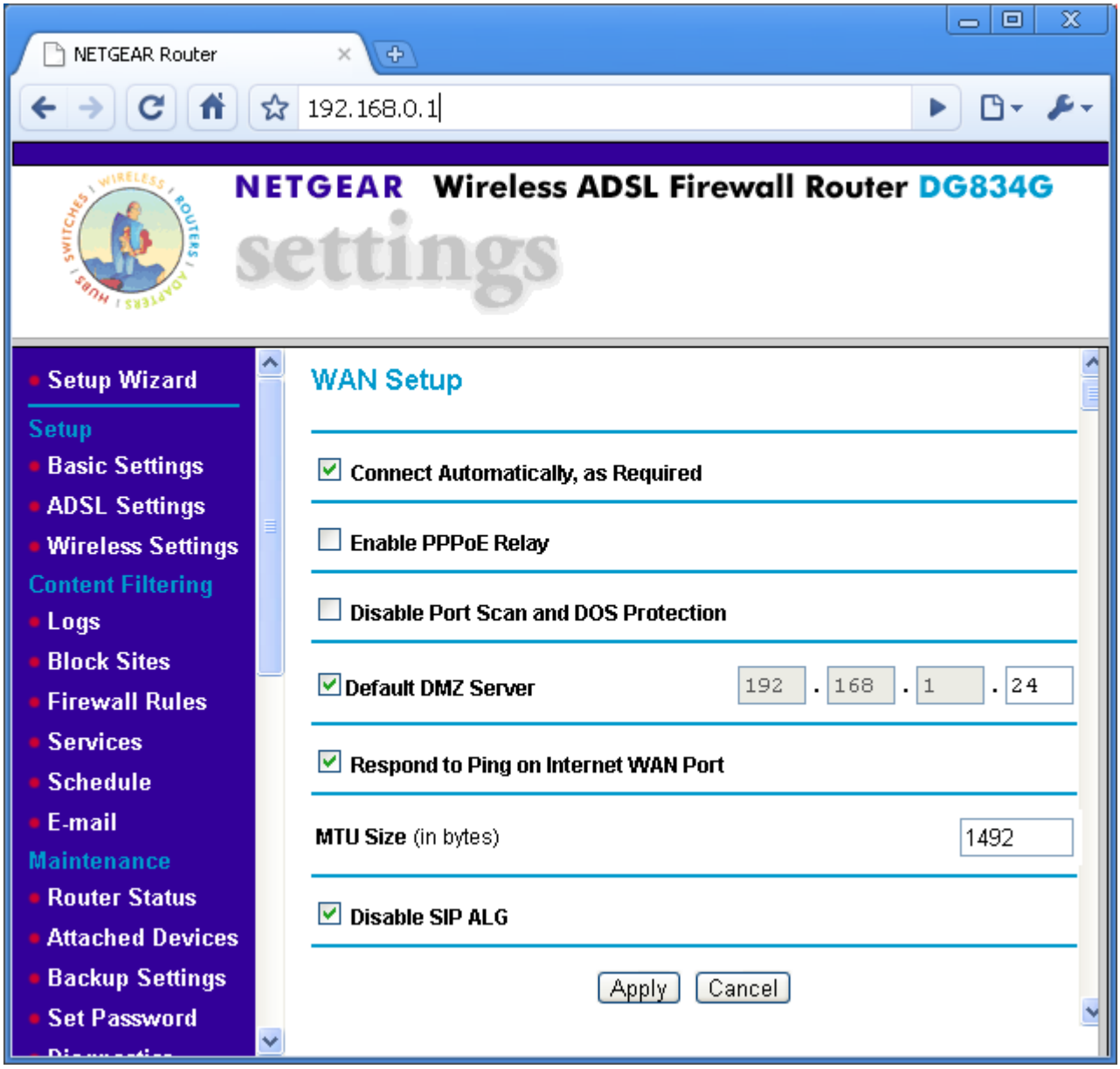
SIP ALG

If the router has a parameter called **SIP ALG** it should always be **Disabled** in both the Control and radio end.



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Appendix A - Audio coding

Quality 1 or 2 is recommended for short wave listening, they are good compromises between quality and need for bandwidth. Practical test have shown that quality 0 (G711) is not the optimal coding if the signal to noise ratio is low which is common on the shortwave bands. Quality 8 gives a very good audio quality even if you listen to music on FM. 16 kHz sample rate and 16 bits deep gives a very good dynamic range and a large SNR and good audio bandwidth. Quality 11 and 12 can be used when very limit bandwidth is available, the audio quality is reduced. The other qualities are more of academic interest. A good speaker is always a good investment also.

Note – Different codings can be used in the uplink and downlink, which can be useful in asymmetrical Internet links like ADSL and most mobile systems. Sample rate must be same in both ends but coding can be different.

Audio quality	Coding	Sample rate [kHz]	Bandwidth dual-rx=0 [kbps]	Packet size dual-rx=0 [ms]	Bandwidth dual-rx=1 [kbps]	Packet size dual-rx=1 [ms]
0	A-law (G711)	8	80	20	160	20
1	Linear-12bits	8	120	20	240	20
2	Linear-16bits	8	160	20	320	20
3	A-law (G711)	12	120	20	240	20
4	Linear-12bits	12	180	20	360	17,8
5	Linear-16bits	12	240	20	480	13,3
6	A-law (G711)	16	160	20	320	20
7	Linear-12bits	16	240	20	480	13,3
8	Linear-16bits	16	320	20	640	10
9	A-law (G711)	24	240	20	480	13,3
10	Linear-12bits	24	360	17,8	720	8,9
11	Linear-16bits	24	480	13,3	960	6,7
12	IMA ADPCM 4bits	8	48	20	96	10
13	IMA ADPCM 4bits	16	96	20	192	10

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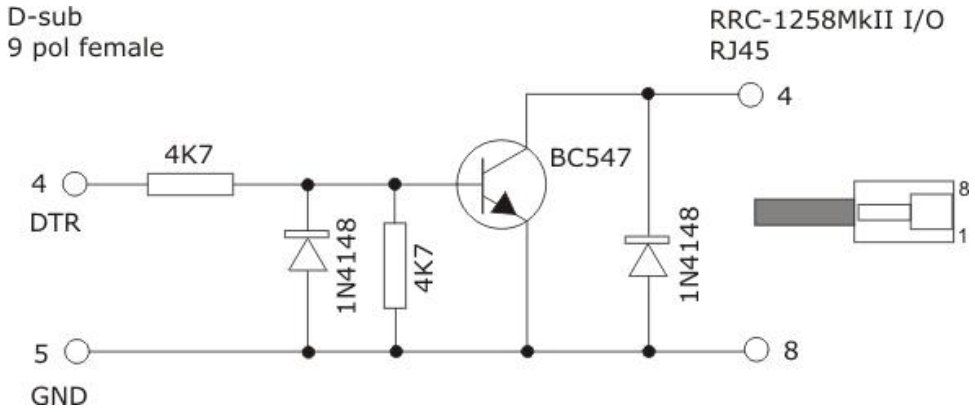
Appendix B - COM-port Keyer interface

There are lots of different solutions on the Internet, but this is very simple and can be implemented in the D-sub housing. No values are critical; just use what you have in the junk box.



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Appendix D - Technical Data

Product/Art no:	**Remoterig RRC-1258MkII**
Dimensions (LxHxD):	165 x 140 x 34 mm
Weight:	2 x 250 g (excl. power supply)
Ip class:	IP20
Power supply requirement:	10-18V DC via DC Plug 2.1 mm/5.5mm
Current drain at 13,8V:	App. 160 mA up to app. 600 mA depending on audio level and ev. Back-lighter
Network connection:	RJ45 T-Base10/100
Speaker amplifier:	2W (8 ohm)
Mic input:	Dynamic or Electret with DC feed
Radio protocol (detachable front):	Kenwood TS-480, TS-2000 ICOM IC-703, IC-706, IC-E2820, IC-R2500. Alinco SR-DX8
Radio protocol (traditional control):	ICOM CI-V, Kenwood PC-control, Yaesu CAT, Elecraft
Protocol Internet:	TCP/IP, UDP, DHCP, SIP, RTP, DNS, DynDNS etc.
Codec:	G711 A-law (8kHz/8bit), 8kHz/16bit, 16kHz/16bit mm.
Bandwidth demands:	From app. 90 Kbit/s up to app 1 Mbit/s depending on codecs and settings.
USB:	USB 2.0 (mini)
Serial ports (transparent):	2 x RS-232 (57600 baud) 1 x TTL (57600 baud)
CW-keyer:	10-40 WPM, Iambic A/B, Squeeze, side-tone
Usable temp range:	0 to +40 °C
Humidity range:	30% to 90% RH

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Appendix E - Safety and Regulatory Information

FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Safety Notice

- Do not use this product near water, for example, in a wet basement or near a swimming pool.
- Avoid using this product during an electrical storm. There may be a remote risk of electric shock from lightning.
- Warning: Never operate this device with a headset or other audio accessories at high volume levels. Hearing expert's advice against continuous high volume operation, if you experience a ringing in your ears, reduce the volume level or discontinue use.
- Never connect a power supply of more than 18 VDC to the power jack. The supply voltage must be between 10 V and 18 V. to prevent damaging the device.

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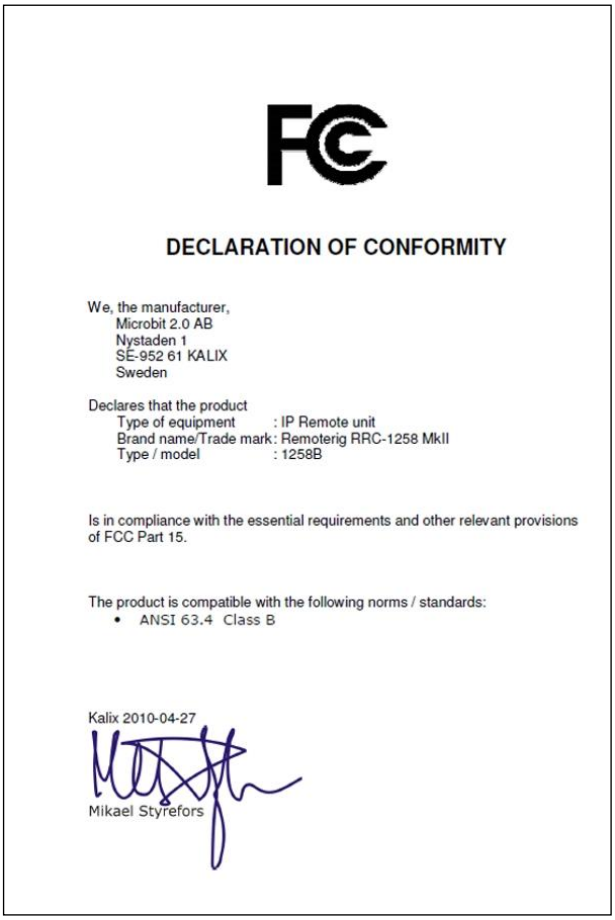
FCC / CE - Declaration of conformity



DECLARATION OF CONFORMITY

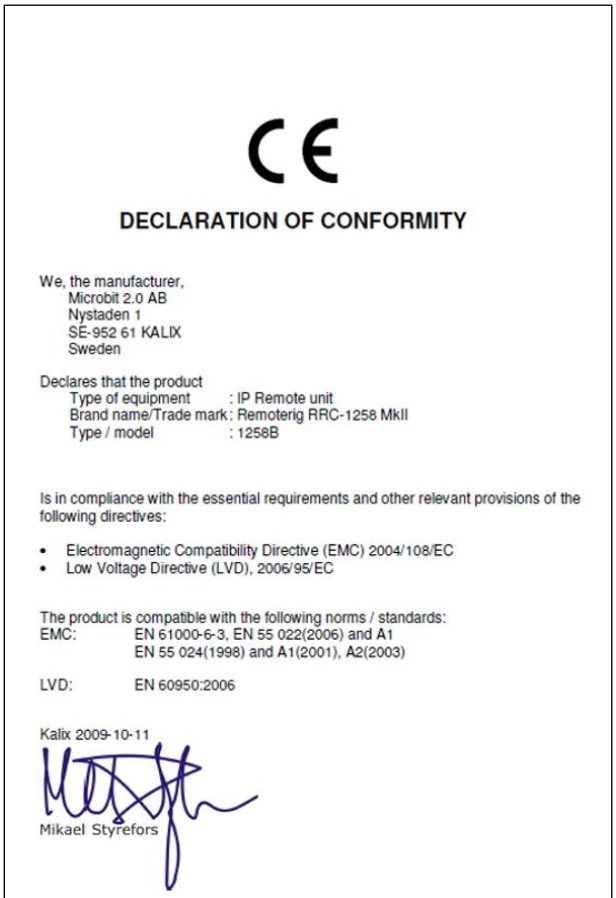
We, the manufacturer,
Microbit 2.0 AB
Nystaden 1
SE-952 61 KALIX
Sweden

Declares that the product
Type of equipment : IP Remote unit
Brand name/Trade mark: Remoterig RRC-1258 MkII
Type / model : 1258B

Is in compliance with the essential requirements and other relevant provisions of FCC Part 15.

The product is compatible with the following norms / standards:
- ANSI 63.4 Class B

Kalix 2010-04-27
Mikael Styrefors



DECLARATION OF CONFORMITY

We, the manufacturer,
Microbit 2.0 AB
Nystaden 1
SE-952 61 KALIX
Sweden

Declares that the product
Type of equipment : IP Remote unit
Brand name/Trade mark: Remoterig RRC-1258 MkII
Type / model : 1258B

Is in compliance with the essential requirements and other relevant provisions of the following directives:

- Electromagnetic Compatibility Directive (EMC) 2004/108/EC
- Low Voltage Directive (LVD), 2006/95/EC

The product is compatible with the following norms / standards:
EMC: EN 61000-6-3, EN 55 022(2006) and A1
EN 55 024(1998) and A1(2001), A2(2003)

LVD: EN 60950:2006

Kalix 2009-10-11
Mikael Styrefors

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Appendix F - Contact Information

Support site	www.remoterig.com
E-mail	info@microbit.se
Web site	www.microbit.se
Phone	+46 923 69620

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